THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

JANUARY, 1878.

ŒSOPHAGOTOMY IN THE DOG.

BY A. E. MACGILLIVRAY, V.S., BANFF, N.B.

ABOUT six weeks ago I was asked to look at a dog belonging to a gentleman in this town, which was said to have a bone stuck in its throat. On attending and examining the dog I found no bone in the throat; there was evidently, however, an obstruction in the œsophagus, about midway between the throat and sternum. I used every means I could think of to remove (up or down) this obstruction—external manipulation, various sorts of probangs, and several forceps—but without avail.

The owner, being intimately acquainted with Drs. Manson and Hirschfeld of this town, consulted with them, and they kindly consented to see the dog. After these gentlemen had examined it, and had tried a great many different kinds of probangs and forceps, it was concluded that relief could only be given by performing œsophagotomy.

Accordingly, the animal being properly and conveniently secured on a table, was put under chloroform, and Dr. J. C. Hirschfeld operated. After making a pretty large cuticular incision, and cutting cautiously through the subjacent dermal

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muscle, the doctor dissected down between the sterno-maxillary and mastoido-humeral muscles of the left side, and thus on to the obstructed œsophagus behind the trachea: and here it may be remarked that this was the more easily accomplished, owing to the absence in the dog of the omo- or subscapulo-hyoidean muscle, which passes (partly crosswise) along the outside of the trachea. Having arrived at and laid bare the obstructed part of the gullet, a pretty free incision was made in the same, and with much difficulty the doctor extracted two of the coccygeal vertebræ of an ox! One of these vertebræ measured about two inches across the transverse processes, and nearly an inch and a half vertically; the other was a little less in size.

Dr. Hirschfeld closed up the wound in the œsophagus with continuous sutures of prepared catgut, and the external wound with interrupted sutures of horsehair. The stitching of the gullet was an extremely difficult job, but was very successfully done.

The dog was restricted to entirely fluid sustenance for several days, and the wound kept clean and dressed outside and inside with a weak solution of carbolic acid.

A most satisfactory and complete recovery soon ensued, the animal being apparently not a whit the worse for the very serious operation.

Remarks.—What struck me most forcibly during the operation was, that without the chloroform it could not under any circumstances have been accomplished; the great amount of cool and cautious dissecting which took place would have produced so much wriggling and twitching as to render such a successful *finale* impossible. Professor Williams in his "Veterinary Surgery" mentions this, and recommends cutting down immediately on the obstruction with one bold "longitudinal incision," thus getting rid of all nervous twitchings by coming to the *casus belli* at once!

By adopting the bold incisive style we, however, have little chance of being able to stitch up the wound in the gullet, as the latter has not been dissected down upon and laid bare *per se* before being cut into; and, *after being cut into along with the superincumbent and attached parts*, I should consider it next to

impossible to dissect and separate away by themselves the lips of the wound in the œsophageal parietes—so as to allow them to be distinctly and satisfactorily stitched together.

I believe œsophagotomy has been successfully performed in the horse, ox, dog, and pig. In man the operation has been performed eleven times, and only twice did death supervene, —so that nine human lives have been snatched from death by œsophagotomy.

In the recently published work on "Veterinary Surgery" by MM. Peuch and Toussaint, a very interesting chapter on this subject will be found; these authors recommend the cautious and "bit by bit" manner of operating—precisely as done by Dr. Hirschfeld in the above case.

Peuch and Toussaint say they have operated twice on dogs—losing one case and saving one.

During the last thirteen years I have met with several cases of dilatation of the gullet (in young horses), immediately in front of the sternum; and in three of these cases, as a *dernier ressort*, I cut into the œsophagus: one case did well, but the other two succumbed. In one case the distension was so great, that when I cut open the œsophagus, I extracted more than a bucketful of ingesta from the dilatation *per* the wound!

In the latter instance, the œsophageal parietes were very much attenuated, and very white and blanched looking.

During the past summer I met with a case of congenital œsophageal dilatation in a foal; here the distension of the gullet extended more than half way up the neck *from the sternum;* and, from the symptoms presented, I am almost certain this abnormal state of matters was continued from the sternum to the cardiac orifice of the stomach. I tried bandaging, pads, and everything I could think of, with little, if any, benefit; the patient is, however, still alive.

URETHRAL CALCULI.

BY J. T. DUNCAN, V.S., CANADA.

SOME time ago, a farmer from a distance requested me to see a horse of his, which had passed very little urine for more than

thirty-six hours, notwithstanding the administration of liberal doses of saltpetre and sweet nitre. On my arrival I found the patient exceedingly uneasy, abdomen evidently distended, the urethra prominent and full along its visible course, and an occasional drop of urine escaping from it. It was plainly a case of urethral obstruction; and I prepared at once to pass the catheter, as, from the condition of the patient, rupture of the bladder might occur at any moment. On attempting to do so, however, I found, firmly fixed in the urethral tube, and almost completely blocking it, a large, hard, smooth calculus. As it was low down, I attempted to extract it by means of the forceps, but, from its great volume and hardness, it could neither be taken out whole nor reduced in size. The knife was then the only alternative; and as no time was to be lost, I determined to operate with the patient standing. By two careful incisions in the urethral tube, the calculus was removed, and with it escaped the urine in the urethra. Immediate relief was apparent; but the bladder having become paralysed from over-distention, it was necessary to evacuate that viscus by means of the catheter. The horse made an excellent recovery.

With regard to the calculus itself (a very large and fine specimen), the patient unfortunately stepped on and injured it. The remainder, however, which shows clearly the great size of the concretion originally, has been presented to the museum of the Ontario Veterinary College.

This case forms an excellent commentary on the use, or rather the abuse, of diuretics by non-professional gentlemen. It also shows the importance of operating in some cases with the patient standing: had this animal been cast, the bladder would almost inevitably have been ruptured.

This is only the second case of urethral calculus occurring in a practice of seven years; the other being that of a ram. In the latter case, the calculus was exceedingly small; it was discovered in the vermiform appendix, and removed. Unfortunately, rupture of the bladder had already taken place. This specimen I also presented to the Ontario College.

EXTRACTS FROM A VETERINARY SURGEON'S CASE BOOK.

BY D. MENZIES, M.R.C.V.S., ST. AUSTELL, CORNWALL.

Peculiar Case of Tetanus.

Having attended some cases recently that may interest some of the readers of the *Veterinary Journal*, I send them for insertion.

Circumstances prevented me, or the first case would have appeared earlier, as evidence in favour of the correctness of Mr. Litt's view of the case he reported in the *Journal* for April last, under the title of Emprosthotonos. My patient was a seven-year-old horse, used for riding and driving, and about three-parts bred. He was in perfect health on the sixth day of April last, when he was turned out in a field much exposed to easterly winds, which prevailed at the time. When brought home in the evening, the groom noticed him to be very stiff; and next day, when I saw him, he certainly exhibited a most remarkable appearance. His flanks and belly were so much drawn up that there seemed to be a swelling extending from the last rib to the ensiform cartilage, not unlike a case of Acute Pleurisy, which I at first thought it was; but a very cursory examination showed it could not be that disease. Like Mr. Litt's case, his pulse and respiration were normal, and his appetite moderately good.

The inferior muscles of the neck and chest were in a state of tension, and very hard, as were also the abdominal muscles,—the latter resisting my utmost efforts, with my closed hand pressing against them, to make any impression; in fact, as the groom said, I might as well press against a board,—and yet under all this the horse seemed to suffer no acute pain.

His naturally finely-arched neck was drawn down to a straight line with his back, which was rounded, and the superior spinous processes seemed much more prominent than natural: so much so as to attract the attention of the owner, who mentioned this peculiarity in his letter when I was called to attend the case. On moving him out of the stable, he appeared like a horse

suffering from Tetanus; but the spasm of the jaws was absent, nor did his eye and tail exhibit the peculiar appearance usual in that disease. During progression he would poke out his nose and make efforts to elevate his head; but the spasmodic condition of the *levator humeri* prevented his doing so. Like Mr. Litt, I was much puzzled by the symptoms, as I had never seen a case like it, and was at first inclined to think it was Muscular Rheumatism; but the convulsive twitching when the animal was suddenly disturbed, with the other symptoms of Tetanus present, convinced me it must be a form of that disease.

The treatment adopted consisted in enveloping the animal in flannel, which was saturated with hot water every hour during the day; the horse was rubbed dry at night, and a weak liniment applied, after which he was clothed with dry blankets. This hot water treatment was continued daily for a week. The medicines given were ʒii ext. belladonna rubbed down in ℥i chloric æther, morning and night, a powder at noon of pot. nit. and pot. bicarb., with half a pint of linseed oil daily till the bowels were slightly relaxed. This treatment was continued, with evidently good results, for a week, when the hot water applications were left off. He was now able to move and turn in his box with greater freedom, though still much tucked-up in the flanks. The belladonna was then given in smaller doses, and spts. æther nit. instead of the chloric æther, and very gentle walking exercise ordered to be allowed when the weather was fine.

A tonic powder composed of ferri sulph., zingib., gent., and nux vomica, was also given daily instead of alkalies. He continued to improve gradually, and about the middle of May was well enough to resume his duties, apparently not much the worse for the attack.

There were two peculiarities in Mr. Litt's case which were absent in mine—viz., the continual desire to micturate, and the paroxysms; but I think that, notwithstanding these differences, the same pathological condition existed in both cases. I have seen and treated many cases of Azoturia, but I could recognise no similarity between them and the case referred to. The cause, the duration and the symptoms, in both Mr. Litt's case and

mine, prove that the disease was not Azoturia, but a form of Tetanus, which, though rare, was rightly placed by Mr. Litt under the title of Emprosthotonos.

TWO CASES OF HEART DISEASE DUE TO FOREIGN BODIES.

The next case I have to record is that of a half-bred Jersey cow, in milk. She had been noticed slightly amiss for about a week before I was called to see her; and on making inquiries the following particulars were given: secretion of milk diminished by one-half; accelerated respiration—which I noticed was also abdominal; groaning occasionally, especially when moved; but she was said to eat her food as freely as in health, and certainly looked cheerful.

On auscultating the chest, a slight friction sound was quite evident, and this led me to believe the case to be a mild attack of Pleurisy; but as the pulse and temperature were almost normal, I did not anticipate much danger. A draught was given, and a little mustard rubbed into the right side of the chest,—when she was left for the night. On the following morning she appeared much the same, and three doses of nitrate of potash and spts. æth. nit. were left, to be given during the day. Next day, when I saw her, there was no difficulty in diagnosing Pericarditis. Her pulse was strong, with a sharp, angry beat, and numbered 80 per minute; the respiration was more abdominal, and she moaned at every movement. The palpitation of the heart obscured all other sounds within the chest; her countenance had an anxious expression, and the head was rather protruded and depressed. I told the owner that her recovery was hopeless, as she had all the symptoms of a foreign body in the pericardium; and, as further treatment seemed useless, I asked him to let me know when she died.

Next morning I received a message stating that the cow had eaten a bucketful of turnips and drunk a pailful of water the previous night, but was found dead in her stall in the morning; that the operation of removing her skin was nearly completed, and if I wished to open her I must make haste. I rode over at once, and on opening her found the following lesions: areolar tissue beneath the chest, and inside the off fore-leg

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œdematous; diaphragm much inflamed, and adherent to the reticulum. On opening that compartment of the stomach, a small inflammatory patch was discovered, and in its centre a fistulous opening, which was continuous with a canal that led to the heart; in the left ventricle of this organ was a piece of wire about four inches long. One end of this wire protruded about half an inch outside the pericardium, the other end having penetrated quite through the ventricular wall. The wire was corroded and black, and, from the appearance of the canal, must have occupied several weeks in its passage from the stomach to the heart.

I can scarcely think the wire had reached the pericardium when I first saw her; though, undoubtedly, on my last visit not only the pericardium, but also the heart itself, must have been punctured, as the opening in the ventricular wall was much larger than the wire, and discoloured to the extent of a halfpenny around it.

About a week after attending the previous case, I was called to see another cow that had been gradually losing flesh for some weeks. She was now come to within a fortnight of her time to calve, and the owner thought her illness was due to the calf being dead. She appeared feverish, with an anxious countenance, and a great disposition to keep her head near the ground; and, latterly, to rest her chin on the box which contained her food. Her pulse was about 60, indistinct and intermittent; and there was pleuritic friction over the whole of the right side of the chest. Her appetite was capricious; some days she would eat nothing, but seldom refused to drink gruel, which she had *ad lib.* I attended her for ten days; but, as she was gradually getting worse, I at last persuaded the owner to end her sufferings, as the symptoms of a foreign body in the pericardium were so evident as to be beyond doubt, while recovery was hopeless. At this stage the symptoms were: a loud gurgling or churning sound in the chest; pulse indistinct and intermittent; œdema of the submaxillary space, this condition being continued down the lower part of the neck, and ending in a large swelling between the fore-legs.

Her respiration was laboured and entirely abdominal, like a

badly "broken-winded" horse, and the nose was always poked out, whether she was lying or standing, with the chin resting on the ground or side of her manger. There was also regurgitation of blood in the jugulars, extending half-way up the neck; and her appetite was quite gone, though she still drank gruel. There were no eructations in either this or the preceding case, as in some instances which have been recorded.

Post-mortem.—The right side of the chest contained a large quantity of fœtid pus, and most of the organs within that cavity were connected by false membranes. The pericardium was about half an inch in thickness, and the heart itself of a dirty-brown colour. In the pericardial sac was half of a ladies' hair-pin, as bright as a shilling—the brightness being doubtless due to friction in the movements of the heart. On looking at the amount of disease within the chest, it was difficult to conceive how the animal could have survived so long.

Chloroform as an Antidote in Strychnine Poisoning.

On the 3rd of November last I was called in great haste to see a dog which was said to be in a fit.

On reaching the place, a few minutes afterwards, I found a black-and-tan terrier suffering from the effects of strychnine. He was standing with the head drawn back, eyes protruding, and all the muscles in a rigid condition. In about a minute a paroxysm came on, and he rushed forward, to the no little alarm of the on-lookers; but only got a few yards, when he fell in tetanic convulsions. Luckily, I had brought some chloroform with me, and poured about a dram on my handkerchief, and held it over his nostrils. In about half a minute his breathing became easier, the spasms relaxed, and he got on his legs, looking considerably relieved. In a few minutes the rigid condition gradually returned, and another paroxysm seemed imminent; but a timely use of the chloroform arrested it before convulsions came on. I waited three hours, during which I had to apply the chloroform five or six times, and always with the same result.

He had no more spasms after I left, and next day seemed quite well, though looking rather dull and stupid.

RUPTURE OF THE DIAPHRAGM: TEMPORARY RECOVERY.

BY W. WOODS, F.R.C.V.S., WIGAN, LANCASHIRE.

IN the spring of 1874 I was requested by the Ince Hall Coal and Canal Company to visit a carthorse which, it was reported, had been jammed between two coal-waggons, the buffers striking the posterior ribs: as the driver of the horse expressed it, "the buffers nearly met." On being released, the unfortunate animal immediately fell, and for some time was unable to rise. When I arrived, however, he had managed to get up, and walked from three to four hundred yards to the stable. On examination of the body I discovered fracture of the two last ribs; the pulse was 90, and weak; the breathing heavy, and countenance anxious, and the horse very unwilling to move. The diagnosis was internal hæmorrhage. I ordered hot wet cloths to be kept constantly applied to the abdomen, and administered—

Opii Tinct.	℥ij.
Ol. Lini.	Oj.

On the following morning the symptoms were much the same. The horse often attempted to lie down, but when he got on his knees he immediately rose again, as if the effort produced suffering, and for a short time afterwards the breathing was considerably hurried. There was, however, no attempt to vomit, and the horse took a little mash, though no fæces were passed. The oleaginous purgative was repeated, and to it was added two drachms of aloes in solution. The hot water fomentations were continued.

On the third day the bowels began to respond; the countenance was less dejected, and the horse was evidently in less pain; though now he remained constantly in one position, and made no attempt whatever to lie down.

From this date he continued to improve, though five weeks elapsed before he was put to work: for a week or two to carting, and then to his ordinary occupation of waggoning.

He continued at this work for fourteen months, apparently perfectly restored; when I was again hurriedly requested to see

him. He was dead, however, before my arrival, which was some time after I had been sent for.

On examination of the body, I found an extensive rupture of the diaphragm, passing through which, and lying in the thoracic cavity, were found the whole of the stomach and some of the small intestines. The borders of the ruptured portion of the diaphragm were perfectly healed, and had a thickened edge like a selvage. This appearance led me to conclude that the stomach had been forced into the thoracic cavity on the receipt of the injury by the coal-waggons.

Should these crude observations be deemed worthy of insertion in your valuable journal, I shall be most happy to place them at your disposal.

SINGULAR CASE OF DELIRIUM IN A HORSE.

BY J. W. HILL, M.R.C.V.S., WOLVERHAMPTON.

On the 7th December, a three-year-old grey mare pony was brought to the infirmary, suffering from Colic. She left the following day apparently well. On the 12th she was again brought to us for advice. The owner had that morning driven her a considerable distance, and when near home she exhibited signs of distress, and could only proceed at a walking pace. Immediately on her arrival at the infirmary she lay down; and when I saw her, shortly after, she was in a cold sweat, her nose propped on the ground, fore limbs extended and flexed as if in the act of rising, the hind ones gathered under her. The pulse was weak, rapid, and fluttering; the breathing short and difficult; and the extremities deathly cold. Auscultation revealed congestion of both lungs. An ordinary diffusible stimulant had been administered when she first came in. I now ordered 4 oz. of brandy with ½ oz. of tinct. ferri, to be given in a little tepid water, and mustard to be applied to the sides, and friction to the ears and extremities. An hour later I found the breathing less laboured, and the extremities warm, and pulse firmer. Shortly afterwards, hearing a considerable noise in the box,

I hastened to the spot, and discovered the animal lying on her broadside (the left), and, as it were, trotting at an enormous rate. Every limb was pounding away in precisely the same manner as they would do in fast trotting—fore and hind limbs keeping exact time. The head was extended, the nostrils dilated, the ears pricked, and the tail carried out; but the eyes were unnaturally prominent and fixed. So unusual was the spectacle, that a number of persons collected round the spot to witness it. The poor animal, which was drawn into the middle of the box to prevent further damage to itself and its surroundings, appeared utterly unable to control its movements; indeed, the action of the limbs increased, until the rapidity of their motion was simply extraordinary.

This imaginary race, if I may so term it, lasted seventeen minutes—ceasing, with a shrill neigh, almost as suddenly as it commenced, and leaving the patient bathed in perspiration.

For some time afterwards, if touched or excited by noise, the limbs were brought into the same action again immediately; but a gentle word and quietude had now the effect of soothing the patient.

Horses, cattle, and dogs I have frequently seen delirious, but never before in a like manner to this case. In this instance the poor animal was repeating, in imagination, the performance it had that morning and two days previously gone through; for I subsequently learned that she was a noted trotting pony, and had been accustomed to do her seven miles in thirty minutes.

Between three and four hours after the above delirium, she became fully conscious; tepid water was offered, of which she drank greedily; and afterwards, with some little difficulty, she rose to her feet, ate a warm mash, and continued gradually to improve. For three days subsequently a short cough was present, and the breathing was accelerated; but under the treatment pursued the former disappeared, and the latter (now the 16th) is almost normal.

Editorial.

SIR THOMAS WATSON ON HYDROPHOBIA AND RABIES.

QUITE recently, the subject of Rabies and Hydrophobia was largely occupying the public mind, and the alarm the prevalence of the double-designated disease had created was calling forth innumerable articles, observations, and letters from all sorts and conditions of men—and even women. We have already alluded to the loose and oftentimes wild writing which the "mad dog" and Hydrophobia panic produced, and the strange and frequently absurd notions promulgated by persons who should certainly have been better informed. Thanks to the labours of members of the veterinary profession, the subject—in so far as its most important and salient features, and the measures necessary for its prevention and suppression are concerned—was exhausted some time ago, and everything really necessary to be known with regard to it had been elucidated. Notwithstanding this, however, the public press and some medical journals treated it as if it were some appalling, new, or mysterious disease, and doubt, speculation, and perplexity seemed to prevail; when suddenly it was announced that Sir Thomas Watson—an honoured and well-known name in the annals of British medicine—was about to contribute a paper on "Hydrophobia and Rabies" to the December number of the new monthly magazine—the *Nineteenth Century*. The announcement produced a kind of lull in the rabäic storm; and the publication of the article was looked forward to, we believe, with much anxiety, as it was presumed that if it did not throw much new light on the terrifying malady, yet it would certainly settle a great deal, if not everything, hitherto uncertain with regard to it. For ourselves, we confess to the existence of some curiosity and interest as to its appearance; for having made a special study of the disease, we wondered what could possibly be added to that which had already been made known. Having read the contribution, we confess that our curiosity has been disappointed and our interest unrewarded. The article is scarcely worthy of the high reputation of the writer, and is certainly behind the times; inasmuch as the views propounded are old and well-worn, while the results of modern investigation and the opinions and researches of modern investigators are ignored. Blaine and Youatt are the only veterinary authorities Sir Thomas appears to be acquainted with; and the many observers who have devoted themselves to a study of Rabies in animals since the days when these two excellent writers described the disease, are either overlooked or forgotten. Hence the magazine contribution may be said to belong to the days of Blaine and Youatt, rather than to the present time. While it does some service in pointing out popular and dangerous errors, such as the "water-test" for the malady in dogs—a service which had been performed by every previous writer who had any knowledge of the subject—it yet perpetuates some errors which have been exposed for years, and we assuredly think it is not to be commended for either the preventive or suppressive

measures it proposes, while some of the views propounded are, we venture to assert, open to discussion.

Alluding to the malady as one which might be permanently got rid of, he says: "The disease, or rather the pair of diseases, to which I advert, consists of Hydrophobia in the human species, and Rabies. It is well to keep in mind the distinction between these two. There would be no Hydrophobia were there no Rabies; there can be no Rabies unless it be communicated by a rabid animal: but they are not identical diseases. To use the concrete form of speech, Rabies in the dog is quite different and distinct from Hydrophobia in the *man*. The term Hydrophobia is often erroneously applied to both diseases, but the rabid dog is never hydrophobic." That the rabid dog is never hydrophobic (*i.e.* afraid of water) is a fact long known; but that Rabies and Hydrophobia are quite different and distinct diseases, we altogether beg to deny. There is undoubtedly some difference between the symptoms in man and the dog, but the difference is no greater than between the dog and horse, sheep, cow, or pig. The virus of Rabies will produce Hydrophobia, and *vice versâ;* this has been proved by accidental and experimental inoculation. We gave our monograph on the disease ("Rabies and Hydrophobia") the double designation, simply with the view of exposing an error and preventing a mistake, as the term Hydrophobia applied to the malady in the *dog* was dangerously misleading, while in *man*, though not always applicable, it yet was a popular name that could not do much harm. The two designations signify one and the same disease, the symptomatology of which varies somewhat in different species. "Hydrophobia" is not a good designation. As to there being no Rabies unless it be communicated by a rabid animal, this is a question not yet quite decided in the minds of those who have had great experience in the malady, and who have given a lifetime to its study; and there is undoubtedly much strong and striking evidence to be overcome before some excellent authorities can accept the dictum of Sir Thomas. "In the canine race," he adds, "Rabies can propagate Rabies; but Hydrophobia does not (as I believe) ever reproduce itself." This is a mistake, as we have just said; Hydrophobia in man having produced Rabies in animals, and from these doubtless Hydrophobia could have been again developed. If we are to consider Rabies as a zymotic disease, such a result might certainly be expected. Sir Thomas justly insists, as we ourselves have repeatedly done during the present outbreak, on the peculiar symptoms of the disease precluding any one who has ever seen it from mistaking it for any other malady, and that it is not a disease of the imagination: in support of the latter assertion he instances the malady appearing in infants and idiots—and, he might have added, in animals.

In attempting to explain the long incubatory period which is observed in some cases, he reproduces views he promulgated some forty years ago, to the effect that the virus is encysted at the seat of inoculation, and retained there until some cause allows it to enter the blood. This opinion, however, he admits to have been originated by Dr. Thomson, in 1826.

The identity or analogy between Hydrophobia and Tetanus has been frequently brought forward during this outbreak, and we have ventured to combat the notion, as will be seen in the Correspondence pages of the last number of the *Veterinary Journal*. Sir Thomas confirms our opinion that the differences between the two are very clearly marked. "It is true that slight touches of the body will excite the tetanic spasm, but it is the rigid or abiding form of spasm which relaxes gradually and slowly; whereas in Hydrophobia the spasms are sudden and frequent—such as are popularly called convulsions. In Tetanus there is no thirst, seldom any vomiting, no accumulation of tough and stringy mucus in the mouth and throat. The mental faculties are clear, and the patient is serene, and what is called heart-whole to the last." We may remark that in animals the distinction between the two diseases is even more marked than in man; and Sir Thomas might have noted that the one is an inoculable or virulent disease, while the other is not.

With regard to incubation in animals, Sir Thomas writes: "I do not know whether the period of incubation in a dog which has been infected with Rabies by the bite of another rabid dog has been accurately ascertained." If the author had consulted our work on "Rabies and Hydrophobia" (p. 178),* he would have found ample evidence as to the latent period of this disease in the dog, as well as in other animals. It is remarked that, "as a help towards determining whether a dog which may have been destroyed under equivocal circumstances was indeed rabid, it may be useful to state that in the stomach of a really mad dog there are always to be found very unnatural contents—straw, hay, coal, sticks, horsedung, earth, as well as a quantity of a dark fluid like thin treacle, altered blood in fact." Now, though we have insisted on this abnormal condition of the contents of the stomach, in the work just alluded to, yet we have been no less careful in showing that the absence of these matters from the interior of the stomach is sometimes noted in the rabid dog, and that a hasty conclusion from their presence or absence is to be deprecated.

With regard to the protective or preventive measures when a person has been wounded by a rabid animal, Sir Thomas lays stress on the early and complete excision of the bitten part as the only means of prevention in which much confidence can be placed; when this cannot be effected, the wound should be cauterized. He is opposed to the use of the actual cautery, and thinks that the virus and the tissues of the bitten part might be as readily and thoroughly destroyed by means of a glass brush with nitric acid. But excision requires an expert surgeon—and he, and also the nitric acid and glass brush, may be miles off when a person is bitten; but the actual cautery can be found everywhere and at once, and be applied with comparative safety and painlessness by any one. Sir Thomas apparently overlooks, forgets, or ignores the statistics we have collected with regard to the value of the

* That Sir Thomas was in possession of the work is abundantly evident from his article, and also from the reference he makes in one part: "In an elaborate and valuable treatise on 'Rabies and Hydrophobia,' Mr. George Fleming adduces conflicting evidence," etc.

actual cautery. Excision has frequently to be long delayed; and, besides requiring great skill and accuracy, and being frequently impracticable or tedious, causing the loss of valuable time, it is not always reliable. Suction Sir Thomas does not counsel; whereas we have laid the greatest stress upon its immediate adoption, as the most likely means of removing some, if not all, of the poison before it has had time to be absorbed or get beyond reach. "When I call to mind what Mr. Youatt has said of the danger attending the contact of the poisonous saliva with even sound mucous membranes, and, further, the risk that the sucker's lips might, whether he knew it or not, be chapped or abraded, I dare not counsel the expedient of suction. By adopting it the sufferer might be rushing, or bringing his helping neighbour, into the very peril he was anxious to avert." Suction for the removal of poisons from wounds has been practised from time immemorial, and yet there is no evidence whatever to prove that it has been a fatal practice. On the contrary, not only has the operator in every recorded instance escaped danger, but the operation itself appears to have, in many cases, preserved the life of the wounded individual. The poison is not retained in the mouth of him who sucks, but is immediately and forcibly expelled, along with cleansing saliva; so that, if there be any danger at all, the chances must be exceedingly few. And if there happened to be any trifling or even great risk, we hope no one would thereby be deterred from at once seizing the opportunity of preserving a fellow-creature from the contingency of a terrible death. Almost daily there are volunteers who nobly and generously risk far greater dangers than this to save human life. It must ever be remembered that time is a most important element in preservative measures, and that waiting for caustics, cupping glasses, and the surgeon's scalpel, may be synonymous with waiting for an agonizing death. We ourselves would not hesitate for a second in applying our lips to and sucking the wound inflicted upon a fellow-creature by a rabid or suspected animal, and we should hold any one in the lowest estimation who declined to do so on the plea advanced by Sir Thomas Watson.

The remaining preventive measures recommended in his paper have already been counselled by other authorities.

With regard to extinguishing Rabies altogether, Sir Thomas only gives Youatt's notion of a well-enforced quarantine of every dog in the kingdom for a period of seven months, and Bardsley's suggestion that the importation of those animals should cease during the existence of this quarantine, destroying every dog in which the disease should appear during this time; and he adds that "it is much to be wondered at that these wise suggestions should remain so long neglected by our sanitary authorities." It is almost needless to note that such a quarantine could not be rigidly enforced for so long a time, and if not so enforced it would probably be useless; besides, even if successful thus far, and admitting that the disease owes its maintenance solely to its contagious properties, we should afterwards always be liable to its conveyance from other countries where it prevails, unless we entirely prohibited the importation of dogs. And are we at all certain that the latent

interval between inoculation and the development of the symptoms, is never more than seven months in the dog? Sir Thomas himself alludes to the latent period in man extending to five years, and even seven years: why may it not be as long in the dog?

With regard to the treatment of Hydrophobia, it is indeed astonishing to find this high medical authority throwing up his hands in despair, and exclaiming that there is nothing for the unfortunate victim but the "euthanasia"—which, we are told, is best promoted by some narcotic drug, such as chloral hydrate—to mitigate the sufferings to their close. Surely such is not the doctrine or the genius of medical science towards the end of the nineteenth century! Modern medicine does not, dare not, despair of a cure for, or a method of curing, the disease; and we may rest assured that, with our ever-increasing knowledge of therapeutics, and of physiology and pathology, attempts will be made to save the life of the hydrophobic patient. In days gone by, the unhappy person received the euthanasia between two mattresses, with several individuals seated on the top in order to produce suffocation more quickly. Sir Thomas is not much more advanced in his treatment.

Sir Thomas is in error in his statement that "Hydrophobia owes its parentage exclusively to the poison furnished in the first instance by the rabid dog, or by rabid animals of the same species." We know, from abundant evidence of the most distinct, authentic, and painful kind, that Hydrophobia has been produced by the bite of the skunk, racoon, hyæna, jackal, wolf, and fox, as well as the cat. This evidence is to be found in "Rabies and Hydrophobia."

Sir Thomas is no more correct in some of his statements with regard to the geographical distribution of Hydrophobia. For instance, he repeats the assertion, so frequently made, that Rabies is unknown at Constantinople, and quotes the evidence of a military officer who was a few months there. This is an entirely fallacious statement, as we have often had to point out, and as we have specially mentioned in our book so frequently alluded to. Medical men living in Constantinople have witnessed cases of Hydrophobia there—though rarely—and due to bites from dogs and bites or scratches from cats. Ahmed Effendi, professor of veterinary medicine in the Military Academy at Constantinople, at the International Veterinary Congress held at Vienna in 1865, testified to this fact, and adds, "In Turkey the disease exists, and appears, though very seldom, not only in dogs in villages and in the country, but likewise in those in large towns." Rabies and Hydrophobia are witnessed in both European and Asiatic Turkey—where, and in Persia, they are known as "Sag diwinah." The pariah dog of Constantinople is found all over the East. Sir Thomas quotes the evidence of Mr. Kroll to the effect that "he never heard of a single case of Hydrophobia in Africa during travels there extending over two years." We do not know what part of the African continent is alluded to; but the disease certainly exists, and sometimes prevails very extensively, in North Africa. The proof of this is given at some length in our monograph.

Sir Thomas puts us in his debt by furnishing us with two additional

and recent facts, which still further corroborate what we have stated elsewhere, and will be acceptable to veterinarians. Mr. Wrench, of Baslow, in Derbyshire, writes: "A small terrier belonging to myself was bitten by an undoubtedly rabid dog, and was consequently destroyed about a fortnight afterwards, and before it had shown any symptoms of disease. In the meantime it had licked the cropped ears of a bull-puppy which had not been near the first-named rabid dog; and this puppy went mad about eight weeks after his ears were licked."

The other observation goes to prove that the disease may be transmitted from the mother to her offspring, through the medium of her milk.

"In the middle of May, 1876, on Mr. Twigg's farm, Harewood Grange, near Chatsworth, a mad dog bit eighteen sheep out of a flock of twenty-one, which were at the time suckling thirty lambs. The sheep were all bitten about the *face*, and had evidently been defending their lambs during the greater part of the night in which the attack was made. Mr. Twigg examined both sheep and lambs, and could not find a single wound on any of the latter. In about a month both sheep and *lambs* began to die, at the rate of two or three a day. The sheep ran wildly about, sometimes carrying stones in their mouths, and the lambs ran away. Of the eighteen sheep that had been bitten, sixteen died; and of the thirty lambs, not one of which was believed to have been bitten, fourteen died. On the next farm the same thing happened to a smaller extent."

We do not think there is anything further to note in Sir Thomas Watson's paper. It is far from being so useful as it might have been, had the existing knowledge and facts with regard to Rabies and Hydrophobia been made available. On such a subject the public requires correct and complete information, and errors should be avoided as far as possible. In no other disease with which we are acquainted have erroneous notions and superstitious and defective information been more apparent, or produced such serious results. It is therefore the duty of every writer to avail himself of all possible sources of information with regard to it, and endeavour to rescue it from the thralls of ignorance and superstition. Sir Thomas had a good opportunity, and it is to be regretted he did not make more of it.

TRICHINOSIS IN AMERICA.

TRICHINOSIS is either becoming more prevalent in the United States of America, or it is more closely investigated and readily recognised. An outbreak occurred in Indiana in 1874, but only nine people were affected, and three of these perished. One pig was the origin of the outbreak: its flesh, which had been converted into smoked sausages, and was full of *trichinæ*, had been eaten in an uncooked state.

The Western States, which are the chief pig-rearing regions, are much infected by Trichinosis; and an examination of the flesh of pigs in south-east Indiana proved that from three to sixteen per cent. are affected. It

is calculated that, in the Western States, five million pigs are killed every winter for the consumption of a large portion of the United States; and if only four per cent. of these are trichinosed, the total number disposed of for food would be upwards of 200,000.

In the outbreak in Indiana, muscular pains were not such marked symptoms as those of Gastro-enteritis. In one case the muscular pains were so acute that movement caused great agony, and there was general Œdema. After death the trichinæ were found to be so numerous in the muscles, that a cubic inch was calculated to contain 100,000. In the other fatal cases, the pathological alterations were those of Gastro-enteritis; only a few trichinæ were found in the muscles, and in the walls of the intestines.

Four cats were fed on trichinosed flesh, and the muscles of three of these were discovered to be swarming with the entozoön. Eight moles and forty-two rats were examined for trichinæ, but none could be found. Hog Cholera and Trichinosis were proved to be distinct affections.

GLANDERS AND FARCY IN PRUSSIA.

THE "Technischen Deputation für das Veterinair Wesen" has issued its report on the contagious diseases prevalent in Prussia during 1876, and the number of cases of Glanders and Farcy for the three last quarters of that year is given. The following is the table showing the result of the inquiries:—

	2nd Quarter.	3rd Quarter.	4th Quarter.
Number of infected districts	119	202	180
,, ,, villages	406	451	338
,, ,, farms or stables	457	552	416
,, horses in infected places	4235	4918	3505
,, diseased ,, ,, ,, ...	949	878	592
,, ,, died	47	45	21
,, ,, killed by order	736	691	436
,, ,, killed by owners	89	76	79

It will be observed that the total number of diseased horses is 2419; of these there died 113, 1863 were destroyed by official authority, and 244 were voluntarily killed by their owners,—the entire number disposed of being 2220.

Virchow (*Archiv*, vol. lxvii.), remarking on these figures, says they offer a striking proof of the value of the new laws with regard to the contagious maladies of animals, and afford a comforting assurance as to the suppression of one cause of danger to mankind. He points out that there is a decrease in the number of cases reported and killed in each quarter, and that this decrease must be due to the manner in which the veterinary police measures are carried out. As to the contagium of Glanders, Virchow clings to the opinion that it is of a "fixed" nature. He admits that the opinion as to its being "volatile" is very prevalent, and that there are many facts in support of this opinion, But the figures given above confirm him as to the fixed nature of the contagium—a view he has entertained for a long time, and which he promulgated many years ago when he wrote that "the volatility of the contagium of Glanders has not been sufficiently proven" (*Specielle Pathol. und Therap.*, Erlangen, 1855).

ENTOZOA IN THE ABDOMINAL CAVITY.

PROFESSOR ANACKER, of Berne (*Thierarzt*, 1875, *Rec. de Méd. Vétérinaire*, 1875), is of opinion that we are not sufficiently acquainted with the diseases occasioned by the presence of entozoa in the abdominal cavity, when these creatures have entered it after penetrating the walls of the intestines. He states that this occurrence is far from being rare, and especially with the *Ascarides*, whose mouth is horny and at times furnished with teeth. He has frequently found, on making an autopsy of dogs and cats supposed to have been poisoned, or to have died suddenly from some unknown cause, lesions of the mucous membrane of the small intestines, which could only be attributed to the presence of numerous *Ascarides*—especially the *Ascaris mystax*—which are sometimes found agglomerated in large clusters. The intestinal mucous membrane, and particularly that of the duodenum and near the pylorus, showed many small round points of a deep-red colour, and surrounded by a tumefied areola. The large number of these minute ulcers, due evidently to suction by the *Ascarides*, gave rise to a veritable Catarrhal Enteritis. In the cat, the same inflammatory condition of the mucous membrane of the intestine is not unfrequently produced by the *Tænia crassicola;* this form of Enteritis is often fatal to kittens. Unterberger, Delahays, and Prangé, have witnessed a mortality among rabbits, pigeons, and poultry, from the presence of *Ascarides*. In certain fishes—notably the bream—the intestinal walls are sometimes found completely perforated by the larvæ of *Ligula*, which give rise to Ascites and become a pellet of fat.

THE HISTOLOGY OF THE MAMMARY GLAND OF THE COW, AND THE PATHOLOGICAL CHANGES INDUCED IN THE SAME BY TUBERCULOSIS OR "PERLSUCHT."*

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(*Translated by F. S. Billings, from Virchow's Archiv*, vol. LXVII., part iv., p. 531.)

THE mammary glands are constructed, as is known, on the type of conglomerate glands. They possess lobulæ, formed by the union of the alveolæ, from which the *ductus lactiferi* proceed, and the branches of which form the excretory channels. Between the lobulæ and alveolæ we find connective tissue, in which vessels and nerves penetrate.

The alveolæ have, during the process of lactation, a clavated form, their length being 0·105 to 0·180 mm., and diameter 0·060 to 0·120 mm. The alveolæ form cysts, in which we recognise the secreting epithelium and *membrana propria*. The epithelium which lines the inner surface of the *membrana propria* varies in different parts of the gland. That in the alveolæ is cylindrical or cubical in form, and from 0·012 to 0·018 mm. in size, having a fine granular protoplasm, with a large oval or round nucleus which is very refracting in the fresh preparations. But if the preparation be hardened in

* *Perlsucht* is the German name for the disease commonly termed "*Tuberculosis*," but it is doubtful if this name is applicable, as will be seen from the following description; therefore, for want of a better, the German word is used in the translation. [In "Veterinary Sanitary Science and Police," vol. ii., p. 382, the question as to whether the Tuberculosis or *Perlsucht* of cattle is identical with Tuberculosis in man, has been fully discussed, and the views of Schueppel adduced in favour of this identity.

Müller's fluid or alcohol, and stained with carmine or hæmatoxylin, there may be seen one or two nucleoli in the nucleus. Under the epithelial layers may be recognised, here and there, small round sub-epithelial cells, sometimes pressed closely together, and exactly corresponding to those forms described by Heidenheim * as a strata of young epithelial cells (germ-cells) in the submaxillary gland. In other lobulæ, the alveolæ possess a stratiform epithelium, the cells of which are polygonal in form. The innermost stratum contains the largest cells; these usually contain fat globules. Beneath the inner layers of polygonal cells we find one or two rows of round sub-epithelial cells, varying from 0·003 to 0·006 mm. in size.

The fat globules are formed by the contents of the alveolæ, and are designated *milk corpuscles*. Upon the *membrana propria* we occasionally find flattened polygonal cells, which, by the action of a ½ per cent. solution of arg. nit., stained the protoplasm yellow or yellowish-brown, whilst their contours were black. In all these cases the *membrana propria* appeared as an idiocyntric membrane of connective tissue, whose connection with the epithelial cells could not be distinguished. The epithelial cells are completely isolated from the *membrana propria*. I saw the epithelial cells become detached, sometimes as irregular groups, at others in the form of scales, which, upon a closer observation, appeared to be isolated epithelial cells, which had been attached to the *membrana propria* by means of a glutinous substance.

Henle † was the first to observe and describe the stellate cells, which belong to the *membrana propria* in the mammary gland of the human subject. Langer ‡ confirms Henle's observation, and says that the *membrana propria* consists of the so-called stellate cells. Kölliker § describes the *membrana propria* as a structureless membrane; and Fürstenberg ‖ came to the same conclusion, after investigating the mammary gland of the cow. Langhaus ¶ thinks that the stellate cells do not form a constant part of the *membrana propria*, but that it is a structureless membrane, or composed of spindle-shaped cells.

In order to study the structure of the *membrana propria*, I took the normal mammary gland of the cow during lactation, and investigated fresh preparations, as well as those hardened in Müller's fluid and alcohol, and stained with carmine, hæmatoxylin, eosin, and tincture of iodine. I removed the epithelial layer from the *membrana propria* of some sections by pencilling; others were shaken in distilled water.

In preparations made in this manner, the *membrana propria* appeared as a membrane composed of flattened stellate connective-tissue cells, united by means of their processes. On a closer investigation, I convinced myself that their projections proceeded from the central part of the nucleated cells—not as a reticulum, but to be considered as striæ, seen in the compact homogeneous membrane; and that these fibres with their stellate cells, together with the homogeneous membrane, form a histological unit. In other alveolæ these striæ were spindle-shaped, from 0·003 to 0·012 mm. in diameter, and 0·015 mm. apart, and ran parallel to the greater diameter of the alveolæ. From these striæ pass off processes which appear as fine condensations (and

However the question may be finally determined, it is now evidently settled beyond dispute that the bovine malady can be transmitted by inoculation and ingestion of the morbid deposits.—ED. *V. J.*]

* Stricker, *Handbuch d. Gewebelehre*, vol. i., p. 310.

† *Anatomie* ii., p. 46.

‡ Stricker, *Handbuch der Gewebelehre*, 1872, p. 627.

§ *Handbuch der Gewebelehre*, 1867.

‖ *Die Milchdrüse der Kuh*: Leipsig, 1869.

¶ *Virchow's Archiv*, vol. lix.

remind one of the reticulum) of the homogeneous membrane, lying between the above-described striæ. In the centre of the stellate, and in various parts of the spindle-formed condensations, we find round or oval nuclei from 0·003 to 0·006 mm. in size, surrounded by a thin layer of protoplasm. For the histological unity of the homogeneous membrane, with its striæ-like thickenings, testifies not only to the transformations of this condensation in the membrane, but also demonstrates the fact that this membrane could not be isolated by pencilling, nor through shaking it in distilled water. The membrane was uncoloured by arg. nit. (½ per cent.); whilst the glandular epithelium was stained yellow or brownish-yellow; the *membrana propria* offered a tolerably obstinate resistance to the action of weak acids and dilute alkaline solutions. I found that the *membrana propria* of the mammary gland of the cow had the same properties as other acinous glands, as described by Boll.* The interalveolar connective tissue is of a fine fibrous variety, containing oval and spindle-shaped cells, which are often united to the *membrana propria* by their processes. The diameter of the interalveolar connective tissue is, as a rule, from 0·003 to 0·006 mm. Between the blood capillaries of the interalveolar connective tissue and the outer surface of the *membrana propria*, we find it encircling the alveolæ, as described by Coyne† in the mammæ of the human subject. In order to convince myself of the existence of peri-alveolic (peri-acinic) lymph spaces, I injected into the interalveolar connective tissue of the mammary gland of a fresh slaughtered cow, a ½ per cent. solution of nitrate of silver. In several preparations we observed black or brown rings around the alveolæ, which I am inclined to consider as lymph-spaces filled with nitrate of silver. In other specimens I detected these rings in connection with lymph capillaries.

The lacteal ducts are lined with a single layer of cylindrical epithelium, from 0·015 to 0·018 mm. in length, and 0·006 to 0·012 mm. in diameter. These cells possess a fine granular protoplasm, with an oval nucleus 0·003 to 0·006 mm. in diameter, which is situated near the *membrana propria*. The contours of the protoplasm cannot be clearly distinguished in fresh preparations, so that it is difficult to distinctly define single cells.

The nucleus in fresh preparations is refracting, but in those treated with Müller's fluid and alcohol it becomes granular. Between the basic ends of the cylindrical epithelial cells, one sees here and there small round oval cells containing large granules from 0·003 to 0·006 mm. in diameter,—the so-called sub-epithelial cells (germ-cells). The cylindrical epithelial cells are not so projecting in the small excretory ducts as they are in the large, and they assume a cubical form as they enter the alveolæ, being 0·012 mm. in size. In the smallest excretory ducts I find the *membrana propria* possesses all the above-mentioned characters. The striæ run parallel to the length of the excretory duct; the distance between each being from 0·009 to 0·015 mm. The *membrana propria* could not be recognised in the excretory ducts; in its place I saw interweaving connective-tissue fibres, and circularly arranged non-striated muscular fibres lying parallel to the length of the excretory ducts, as Henle has described in the mammæ of the human subject, and Fürstenberg in the mammæ of the calf.

In the interlobular connective tissue I found oval, stellate and spindle-shaped connective-tissue cells and elastic fibres, as well as non-striated bundles from 0·015 to 0·045 mm. in thickness, surrounding the lobulæ. In these muscular bundles, particularly after staining the preparations with hæmatoxylin, I could distinctly recognise the non-striated muscular cells (myoblasts), which had the following dimensions: 0·030 mm. long, and 0·003

* *Beitrage zur mikroskopischen Anatomie der Acinösen Drüsen.* Berlin, 1869.
† *Centralblatt f. d. Med. Wissensch.* 1875, p. 110.

to 0·006 mm. in diameter. The width of the interlobular connective tissue is from 0·180 to 0·510 mm. The arteries and veins follow the same course as the excretory ducts. The capillaries wind spirally round the alveolæ, or form a network upon the external surface of the *membrana propria.**

After these histological discussions, I will describe the patho-anatomical changes in the mammary gland of the cow due to "Perlsucht."

"Perlsucht," as is known, is peculiar to cattle—the morbid products being developed upon the pleura and peritoneum as dense nodules the size of peas or hazel-nuts. These appear either as large single papilliform tumours, or as small clusters, united to each other and to the surface of the serosa by fibres of connective tissue. They are known in pathology by the name of pearl-nodules ("Perl-Knoten"). The sectional surface of these neoplasms presents a dense and coarsely-fibred appearance at the periphery, and is soft and fine-fibred in the centre. In the latter case the centre is caseous or calcareous. The lymphatic glands most frequently suffer from metastasis of the neoplasms; but sometimes the lungs and other organs are complicated. As early as 1817 Dupuy described "Perlsucht" as a specific disease, identical with Tuberculosis of the human subject. In the year 1831 Gurlt† was opposed to Dupuy's opinion, and considered the nodules as Sarcoma.

Virchow ‡ was the first to thoroughly examine these neoplasms and to describe them as Lympho-sarcoma. Their lympho-sarcomatous nature is based, according to Virchow, upon the fact that giant cells are developed in the connective-tissue matrix, from the connective-tissue cells; also from the persistency of the elements lying in the spaces of the coarse reticulum; as well as from the progressive, sometimes very rapid, growth of these nodules, and the metastases accompanying this growth.

Gerlach,§ Leisering,‖ Spinola,¶ and others have fed different animals with nodules, tuberculous caseous masses, as well as with the milk and flesh of cows which have succumbed to "Perlsucht." In these, as well as in other animals which have been similarly treated, neoplasms were found to be developed in various organs, and the small nodules were also observed to be very similar to the miliary tubercles of man.

From these experimental researches, as well as from the symptomatology and other clinical features of "Perlsucht," these investigators were led to the conclusion that this disease of cattle and Tuberculosis of the human subject were identical,—as Klebs,** had already attempted to show in another way.

Schüppel†† examined the nodules and tubercles histologically. He thought that both the nodules and the miliary tubercles were developed from giant-cells, and that the giant-cells were characteristic of both in their diagnostic relations. Schüppel also based his assertions as to the identity of the nodules and miliary tubercles upon their histological construction.

Gerlach, Leisering, and others returned to Dupuy's opinion. This opinion seems to have gained much ground, though it is not universal; as is shown by the results of experiments. Thus, miliary tubercles develop themselves if they find a suppurative or a caseous centre (Fränkel and Cohnheim, Ruge), and especially if foreign bodies are present, by the introduction of neoplastic

* The bloodvessels were injected with the following: Berlin blue, 5 grs.; oxalic acid, 5 grs.; gelatine, 50 grs.; aquæ, 50 grs.

† *Lehrbuch der pathologischen Anatomie der Haussangethiere.*

‡ *Würzburger Verhandl.*, 1857, vol. viii., p. 143; *Gesichwülste*, vol. ii., p. 739.

§ *Virchow's Archiv*, vol. li., p. 290; *Archiv f. Thierheilkunde.* Berlin, 1875, vol. i., p. 1.

‖ *Bericht über das Veterinarwesen in Sachsen*, 1864 and 1870.

¶ *Handbuch d. Patholog. und Therapie.* Berlin, 1858, vol. ii.

** *Virchow's Archiv*, 1868, vol. xliv., p. 266; 1870, vol. xlix., p. 291.

†† *Virchow's Archiv*, vol. lvi., p. 38.

detritus (Carcinoma, Sarcoma, and others) into the organism, or from the products of retrogressive metamorphosis of tissues (Vulpian, Lebert, Wyss).

The following question was submitted to me by Prof. Virchow: "What patho-anatomical changes take place in the mammary gland of the cow in 'Perlsucht'?" I accepted the suggestion to attempt the solution of this problem with great pleasure, because there had been so little done up to the present time to settle the question.

The materials for the following experiments were obtained from the mammary glands of six cows slaughtered because of "Perlsucht."

In one case I found, from histological investigation of the mammary gland, that lympho-sarcomatous neoplasms were present in a very early stage of development; in the other five there was merely catarrhal inflammation of the lacteal ducts, and chronic interstitial Mastitis.

Metastatic Lympho-sarcomatous Nodules in the Mammary Gland. (1st case.)

The animal was nine years of age; and on dissection we found nodules varying from the size of a pea to that of a hazel-nut upon the pleura, and in the lungs and bronchial glands.

There was discharged from the *sinus lactiferi* and *ductus lactiferi*, a yellow pus-like fluid containing small flakes. By a microscopical investigation of this fluid, I discovered a large quantity of round cells (pus-corpuscles), and also a number of white blood-corpuscles, which contained one or two small nuclei, or a single large one. The above-mentioned flakes appeared under the microscope as a conglomeration of round cells, which were held together by a granular mass soluble in acetic acid. The tissue of the mammary gland was compact, especially in the superior part. The interstitial connective tissue was very much developed, particularly in the vicinity of the *vena mammaria postica*, where one could distinctly see white striæ of connective tissue; some parts of the gland-lobules were atrophied, whilst other parts were raised above the level of the cut surface in the form of globules, about the size of peas; here and there could be noticed spots resembling adipose tissue, instead of the white lobules.

The lymphatic glands in the neighbourhood of the *vena mammaria postica* were in a hypertrophied condition, and contained a great number of nodules, which could not be distinguished from those on the pleura; the parenchyma had almost entirely disappeared in the centre of these glands, and was replaced by nodules; and only here and there could we recognise remains of the glandular tissue at the periphery of the gland between the nodules.

Different parts of the mammary gland were submitted to examination—some in the fresh condition, others after being hardened in Müller's fluid or a 36 per cent. solution of alcohol. Some of the microscopical sections were examined uncoloured, whilst others were stained (according to Ranvier's* method) by hæmatoxylin and picrocarmine.

Sections taken from the surface of the fresh mammary gland, after being scraped or teased out, and treated with a ½ per cent. solution of natrum chloratum, presented, under the microscope, round, stellate, oval and spindle-formed cellular elements, as well as the so-called giant cells. The round cells contained a large nucleus, with one or two nucleoli. In the stellate, oval, and spindle-formed cells, we found oval or biscuit-shaped nuclei, with one or more nucleoli. The giant cells were round and stellate, having small or large processes. The protoplasm of these cells was granular. The nuclei were situated either in the centre of the cell, or occupied the whole or only

* *Traité d'Histologie.* Paris, 1875.

part of the periphery. Sections of the fresh mammæ, made with a razor, demonstrated that in some places the interstitial tissues were in a fresh hyperplastic condition; other places, on the contrary, were recognised as in the later stage of chronic interstitial Mastitis to a high degree—so much so that the interstitial connective tissue was present in double the quantity it is under normal conditions. Further, between the lobules and also the alveolæ of the glands, I saw round or oval nodules of a lympho-sarcomatous character, which have been described as the elements of the nodules. The nodules were from 0·075 to 0·450 mm. in size, and were composed of giant cells, connected by comparatively long and ramifying processes; they were also united to the surrounding stellate connective-tissue cells and connective-tissue fibres, which form the reticulum of the nodules. In the alveolæ of the reticulum, one finds giant cells which exactly correspond to those just described; also elements containing a single nucleus which resemble granulation or lymph-cells, between which are perceived fine fibres in connection with the reticulum.

In some lobules the excretory ducts were obliterated, whilst others were dilated in a varicose manner, and filled with round cells.

The alveolæ were atrophied in some places; but in others they were distended, and lined with cubical epithelium. In their lumen were found a great quantity of fat-globules. These distended alveolæ were to be found in such places as we have above described, as microscopic white lobulæ, resembling adipose tissue.

The examination of preparations hardened in Müller's fluid rendered it possible for us to explain, and more exactly comprehend, the above-mentioned patho-anatomical changes.

In the above examinations of fresh preparations treated with a ½ per cent. solution of natrum chloratum, I could not clearly define the epithelium of the alveolæ and of the excretory ducts, nor the cellular elements of the previously-described nodules; the protoplasm of the cells was very indistinct, but the nuclei could be more distinctly seen. By treating specimens with Müller's fluid, we render the cell-elements more distinctly visible from their surroundings, while the protoplasm appears slightly granular and the nucleus refracting and of a round or oval form. The nuclei are seen more distinctly if the preparation be hardened in alcohol and stained with hæmatoxylin; whereas, if the specimen be treated with picrocarmine, the nucleus is stained red and the protoplasm yellowish-red, thus rendering the nucleus less visible. By colouring the specimen with carmine this object is frustrated, for not only are the cell-elements stained, but also the connective tissue. The case, however, was different when hæmatoxylin was used; here the nucleus was stained a light violet and the protoplasm bluish, whilst the connective tissue remained unstained.

Preparations treated in this manner facilitate the study of the pathological processes in the interstitial and glandular tissues of the investigated organ. Therefore I am in a condition to discuss more closely the general phenomena already given of the patho-anatomical alterations. The interstitial connective tissue is exceedingly developed, and infiltrated with one or more round cells. Between these round cells I found giant cells, either separate or connected with each other: their size being from 0·030 to 0·075 mm., and containing from three to sixteen round or oval nuclei, measuring from 0·003 to 0·006 mm. Most of these nuclei are found near the periphery, and very seldom in the centre of the giant cells; when the protoplasm is acted upon by a ½ per cent. solution of acetic acid, it becomes clearer, and the nuclei are more distinctly seen. The relations of their processes to one another, as well as to the stellate cells and the reticulum, were exactly as we have already described. I could also distinguish isolated giant cells among

the connective-tissue fibres. If the preparation be teased out, the reticular tissue distinctly shows itself, and reminds one of the adenoid tissue of the lymph-glands. Between the connective-tissue fibres which encircle the alveolæ, and those deposited around the neoplastic nodules, can be noticed hypoplastic connective tissue in various stages of growth, and whole rows of round cells containing a large nucleus. In single preparations, the reticulum which generally surrounded the giant cells was replaced by round, oval—nay, even by epithelial cells. I recognised between the round and oval cells, as well as in the reticulum, granular protoplasmic cells, about the size of hepatic or epithelial cells, which we find on the mucous membrane of the mouth. The cells contain two to three nuclei, measuring 0·003 to 0·006 mm., and from two to five nucleoli.

The blood and lymphatic vessels which we find throughout the normal interstitial tissue, were in many places obliterated, and the final ramifications of the bloodvessels often appeared as continuous lines of spindle-shaped cells.

The patho-anatomical changes in the alveolæ and excretory ducts may be enumerated as follows:—The single lobules are contracted, and far more distant from one another than in the normal condition; the alveolæ are distended like kysts, through the obliteration of their excretory ducts, and are partly atrophied, partly obliterated, in such a manner that in their place rows of spindle-shaped cells are to be perceived, which show their origin through their connection with the *membrana propria* of the excretory ducts.

These alterations find their explanation in the hyperplasia which has taken place upon the interlobular and interalveolar connective tissue, as well as in the great number of neoplastic nodules.

In the partly-obliterated, partly varicose distended excretory ducts, we notice a strata of cylindrical epithelium, under which may be seen one or more strata of germinal epithelium in a state of proliferation; further, thick fibres of connective tissue, which connects the surrounding connective tissue and the *membrana propria.*

In this case we observe numerous nodules in the interstitial tissue of the mammary gland, which occasion, through their development, either distension or contraction of the alveolæ and excretory ducts.

We look upon these nodules as connective-tissue neoplasms, and for the following reasons. Their matrix is connective tissue, which indicates the progressive development of the neoplasm, and surrounding the elements one finds extra-cellular products. In respect to the reticulum of these neoplasms (which has already been described), together with the round elements and extra-cellular products found in it, I believe myself justified in considering these neoplasms as lympho-sarcomatous.

It remains yet to be mentioned that the giant cells found in these neoplasms—a fact which is already known to many—are essential elements in the nodules. According to Virchow,* giant cells form a constituent of the most varying neoplasms, and not only develop themselves from the elements of other tissue cells, but also from epithelial cells, muscle fibres, capillaries, and the endothelium of veins.† Ziegler‡ considered the giant cells as altered

* It is due to Virchow that we no longer look upon all caseous products as tubercle. Through his researches the nature of tubercle is well defined. He considers tubercle to be a group of lymphomatous growths of an unstable character; whilst he describes Lymphosarcoma, as well as the nodules of "Perlsucht," as neoplasms possessing a more permanent character.

† *Virchow's Archiv*, vol. xiv., p. 51.

‡ *Experimentelle untersuchungen über die Heskauft der Tubercle elemente mit besondere Berücksichtigung der Histologenese der Reisenzellen.* Wursburg.

colourless blood-corpuscles.* Rindfleisch thought they originated from epithelial cells. Brodowsky† considered them to be germ cells from capillaries. Schüppel and Visconti‡ held the opinion that they developed from bloodvessels. Klebs, Köster, Langhaus, and Hering§ viewed the giant cells as transverse sections of the capillaries and lymphvessels. According to Weyss, the giant cells have their origin in a confluence of granulation cells. I have never been able to witness the formation of giant cells by the degeneration of blood-corpuscles, nor from the germ cells of capillaries. I have observed bodies resembling giant cells in the nodules of the pleura and lungs; but upon examining them more closely, they appeared to be changed bloodvessels. Not only was their connection with the bloodvessels visible, but there was also a quantity of round and oval elements at their borders, which was nothing more than a proliferated condition of the capillary endothelium; and the fine fibrous or granular masses in the centre of these formations were nothing more than coagulated fibrin. Besides these bodies, genuine giant cells were visible in the nodules of the pleura, lungs, and mammary gland. I perceived, also, round and oval connective-tissue elements, having a large nucleus; also somewhat larger stellate cells, containing two or three nuclei, together with giant cells; and I am inclined to consider the two first as stages of development of giant cells.

I have likewise found the mammary gland of animals, slaughtered on account of "Perlsucht," to present exactly the same histological composition as that which Virchow found in the pleura, lungs, and lymph-glands of cows affected with the same malady, and which he described as Lympho-sarcoma.

This investigation led me to the conclusion that lympho-sarcomatous nodules can develop themselves as metastases in the mammary glands of animals suffering from "Perlsucht," and that the disease is not identical with Tuberculosis.

Catarrh of the Lacteal Ducts and Chronic Interstitial Mastitis (five cases).

The animals were of various ages—between eight and ten years.

On dissection, there were found nodules, from the size of a pea to that of a hazel-nut, upon the pleura and in the bronchial glands.

There was a great quantity of a dense pus-like fluid discharged from the *sinus lactiferi*, through the canal of the teat. A microscopical investigation of this fluid proved it to contain a considerable number of small cells, containing a single large or several small nuclei; also, occasionally, epithelial cells from the alveolæ and excretory ducts, having two or three nuclei. In some cases it escaped from the excretory ducts in a flocculent mass, in which I also detected round cells of the above-described character. Here and there the excretory ducts were obstructed by a caseous mass, the greater part of which was composed of contracted granular cells, about the size of blood-corpuscles, densely packed together. Between these cells we also found round elements, which had a large nucleus and sharp contours. The mucosa of the *sinus lactiferi* and larger lacteal ducts was thickened. A superficial section was very compact, showing that the interstitial tissue is very much developed; here and there were observed cysts, varying in size from a pea to a man's fist, which contain a caseous product. In this pulpy mass the micro-

* *Lehrbuch der pathologischen Gewebelehre*, 1875.

† *Virchow's Archiv*, vol. lxiii.

‡ Visconti, *Sulla origine della cellule giganteschi del sarcoma giganto-cellulare de tubercoli e delle ossa.* Milan, 1875.

§ Klebs, *Virchow's Archiv*, vol. xliv., p. 286. Köster, *Virchow's Archiv*, vol. xlviii., p. 95. Langhaus, *Virchow's Archiv*, vol. xlii., p. 382. Hering, *Histologische und experimentelle Studien über Tuberculose.* Berlin, 1873, p. 105.

scope revealed small round cells, with large single nuclei; and in the caseous mass, shrivelled pus-cells. In two cases, only one gland was involved; in another, both were affected in the manner described.

Professor Virchow recommended me to examine how far the catarrhal process extended, and whether the pus-cells originated from the catarrhal inflammation of the mammary gland.

In order to accomplish this, I investigated in these cases preparations which were treated after the method above described. I found in the interstitial tissue of the mammary gland, connective tissue in a hyperplastic condition, and the connective tissue infiltrated with round granulation cells. The interlobular, as well as the interalveolar, connective tissues had attained a threefold thickness. The excretory ducts were varicosely dilated, and their lumen obstructed with round elements measuring from 0·003 to 0·006 mm. in size, containing a single large or several small nuclei. It is only here and there that the *membrana propria* is in such a high degree of proliferation that it cannot be distinguished from the interstitial tissue infiltrated and surrounded with round cells. I seldom found the excretory ducts in an early stage of catarrhal inflammation; here the sub-epithelial cells (germ-cells) were proliferated and stratified,—so much so that the cylindrical epithelium was either between them or above them (the proliferation cells), and therefore removed to a far greater distance from the *membrana propria* than under normal conditions.

In the isolated epithelial cells lying between the layers of round cells, as well as in the groups of epithelial cells above the round elements, we found "clouded swelling." The lumen of the lacteal ducts free from catarrhal affection, was often found obstructed with round elements, the origin of which is to be sought in the surrounding parts affected with catarrhal inflammation.

The alveolæ also presented different stages of the catarrhal processes. In the sub-epithelial layer (germ stratum), we found an extensive hyperplasia; whilst the *membrana propria* was normal and distinctly perceptible.

The lumen of the alveolæ was obstructed, partly by an accumulation of round cells, amongst which were scattered clouded epithelial cells, and partly by fine granular epithelial cells, and by several strata of round cells forced from the *membrana propria*, in consequence of which they occupied the centre of the lumen: seldom the reverse took place. The lumen of some alveolæ were filled with round cells, whilst the epithelium remained quite normal, and not detached from the *membrana propria*, as mentioned in the above cases. The question now presented itself, What caused the accumulation of round elements (pus-cells) in the lumen of the excretory ducts and alveolæ? Virchow, Föster, and Rindfleisch examined two forms of suppurative inflammation—viz., one only superficial (epithelial), in which the inflammation attacked principally the epithelial layer; the other deeper (parenchymatous), which, together with the deeper tissue layers, as the stratum mucosum and sub-mucosum and so forth, presented an inflammatory appearance. Remak, Buhl, and Eberth were of opinion that upon the epithelium pus-cells originated in an endogenous manner. Cohnheim showed that blood was necessary for the formation of pus; since he proved that under certain conditions colourless blood-corpuscles exuded from the capillaries, and in this manner furnished the material for the pus.

From the above patho-anatomical changes noted in our cases, the pus-cells originated from the epithelial cells (germ cells) being in a state of proliferation; for we neither found changes in the *membrana propria* nor in the interstitial tissues surrounding it, nor yet in the polygonal and cylindrical gland cells. This justifies us in considering these tissues as the seat of suppurative origin.

Up to the present time there has not been, as far as I know, any histological examination of the mammæ of the cow during inflammation ; * and the conditions of Mastitis in the human subject are very little understood, as is proved by the following words of Rindfleisch : "The histology of Mastitis is all but unknown. We must content ourselves with the conceptions of it we have won from inflammatory processes in similarly constructed glands, such as the salivary and the mammary gland, and thereby explain the various phenomena of Mastitis." †

Fürstenberg, Ackermann,‡ and others have only described inflammation of the cow's mammæ (Mammitis) macroscopically. Ackermann's opinion was that cows suffering from "Perlsucht" were affected with a tuberculous disease. It is little understood that catarrh of the lacteal ducts and interstitial Mastitis have nothing in common with "Perlsucht," and that these do not occur in cows affected with "Perlsucht," save as an accessory complication. The mammary glands of the cow, particularly during the period of lactation, are far more subject to inflammation than other organs ; consequently, inflammation occurs with extraordinary frequency in animals not affected with "Perlsucht." Therefore it is that we can find no cogent reason for assigning to such processes a tuberculous character. In making this observation, however, we do not dispute that a mammary gland affected with catarrh forms a favourable ground for the development of disease in other organs from metastasis. We have already mentioned that we found in our first case lympho-sarcomatous nodules in the inflamed mammary gland.

THE CAUSE OF RINDERPEST AND CHOLERA.

DR. G. M. ASHER, Extraordinary Professor at Heidelberg, who has been travelling in Russia, writes from "Malo-Usen," on the Wolga Steppes, an interesting article in the *Vossiche Zeitung*. It appears that in the Steppes of Eastern Russia there prevails a poisonous mildew, which, in many years, damages the crops beyond all calculation. This mildew is, according to the observations of many Germans in these regions, the cause of the terrible cattle-plague which, known as the Rinderpest, is enzoötic in Russia, and spreads thence to other European countries ; and, according to another and credible opinion, the mildew is also at the same time the cause of Cholera. The German colonists of the Wolga Steppes name it the "Höhenrauch"—thick yellow fog ; and in fact it resembles it very closely, the sky becoming dark, breathing difficult, and a nauseous musty kind of odour being perceived. This usually continues for three or four days ; and at this time, if the wheat is ripening, the crop is found to be entirely destroyed. The stalk and the husk become diseased ; the former shows numerous black spots, as if charred, and the latter is covered with a fine closely adhering powder, which is at first violet, and white at a later period. This appearance and alteration is probably due to a fungus. The vitality of the plant is sapped,—the crop is blighted, and many ears have no grain at all. When the colonists speak of the effects of this disease, they say, "The Höhenrauch has squeezed the maize."

When the mildew falls, or has fallen, the people in going over the land have their boots covered with a fine dark yellowish-brown dust. The couch grass becomes diseased ; and when the stalk is opened, it is found to contain

* We, as veterinary surgeons, ought to examine our cases histologically, and so be in a position to enlighten the sister profession by our investigations.

† Rindfleisch, *Lehrbuch der pathologischen Gewebelehre*, 1875, p. 478.

‡ Ackermann, *Jahresbericht für Jahr* 1875, p. 643.

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a considerable quantity of the same kind of dust. In the opinion of the colonists, this dust is the cause of the Rinderpest. On the Steppe there are many stagnant, or almost stagnant, pools of water. The yellow-brown dust falls on these and forms a kind of scum over them, and when cattle drink from them they sicken from the Rinderpest. They never suffer from the disease through drinking running water. Once the Plague commences, it spreads with frightful rapidity, owing to its contagious nature, and frequently the villages lose more than half their cattle; only the most rigid isolation checks its spread.

During the summer in which these investigations were made, the Rinderpest appeared spontaneously, and passing beyond the Steppe, invaded other countries; the mildew was also more than ordinarily abundant, and the cattle drank very freely of the stagnant water.

With regard to the observation that Cholera is a concomitant of these *Hochenrauches*, or "yellow fogs," only one of the colonists questioned—a very intelligent schoolmaster—could give a satisfactory answer. It was elicited, as a matter of no importance, though rather surprising, that this schoolmaster was ignorant of the existence of a book published in 1848 in the Russian language, entitled the "History of the Saratow Country, by A. Leopoldow." In this work is a description of the first outbreak of Cholera, in 1830, with a statement that it was immediately preceded by the *Höhenrauch* alluded to by the colonists in the present year; only it was a denser fog, more blighting, and more difficult to respire. The schoolmaster was not born until after 1830, so that the connection between the *Höhenrauch* and the Cholera was a recurrence, and not a mere coincidence. It is also remarkable that the Cholera in this Eastern region appeared in 1830 and 1831, and a year earlier it broke out in Western Europe. In 1830 it carried off more than 10 per cent. of the inhabitants of Saratow.

The *Höhenrauch* of the Wolga Steppe is, like the Sirocco, a south-east wind, and appears very extensively nearly every year. The fog, however, is seldom dense or very foul-smelling, and only in exceptional years are the crops injured; so that it would appear that the grain must be pretty well developed in the ears before the fog can take effect upon it. Consequently, its effects are only distinctly witnessed for a few days. As the fog passes from the south-east to the north-west, the eastern or left bank of the Wolga is more affected by it than the right. In recent years, however, the crops on the right bank have suffered more than those on the left, simply because sowing commenced a week earlier on the latter, so that the wheat was about a week more forward in growth than on the right bank. It was said that only in this way could the loss of the harvest be accounted for on the right bank, while on the left there was a tolerably good yield. On the right bank only did Dr. Asher find people—the oldest in the country—whose memory carried them back to these bad harvests. He could not ascertain whether it was the same on the right bank. His inquiries were limited to the colonists who live between the 50th and 52nd degrees of latitude,—but it appears to be an indubitable fact, that further north the crops are exempted. Whether, in Southern Russia, there is any connection between failures in the harvest and this mildew, he does not know.

Declining at present to discuss further the question he has raised, Dr. Asher is content to direct attention to its special features and the great practical results which further inquiry may yield. In any case, he adds, the question possesses a high scientific interest in relation to wheat-disease, Rinderpest, and Cholera, and is well worth the notice of the Russian Government. The scientific inquirer, aided by the various countries interested in the solution of the serious problem as to the origin of these maladies, might pursue his investigations on the spot, and definitively settle the question.

"THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY."

[We have been requested to publish the following report.]

AT the last general meeting of the above Society, held in Manchester on the 10th of March, 1875, a resolution was passed that an annual Financial Statement or Balance Sheet should be published in the *Veterinary Journal* and *Veterinarian*. In obedience to such resolution, I beg to submit the following statement. THOMAS GREAVES, *Honorary Treasurer.*

Knott Mill, Manchester.

"THE NATIONAL VETERINARY MUTUAL DEFENCE SOCIETY."

TREASURER'S FINANCIAL STATEMENT, 1877.

CASH RECEIVED.	£	s.	d.	CASH PAID.	£	s.	d.
Balance of account on Oct. 10th, 1876, in bank and in hand .	325	15	5	Dec. 13th, 1876.			
Subscriptions from members from Oct. 10th, 1876, to Nov. 25th, 1877	81	9	10	Cheque for Messrs. Leather and Son—law expenses . . .	18	2	0
Bank interest: two half-years—Dec., 1876, and June, 1877 . .	3	11	10	Ditto, award for loss .	13	10	0
				March 17th, 1877.			
				Cheque for Mr. W. Elam —settlement of claim.	35	0	0
				Nov. 25th, 1877.			
				Stamps and Stationery for thirteen months, rent of room for meetings	2	13	11
				Cash in bank . .	341	11	2
	£410	17	1		£410	17	1
				Nov. 25th, 1877.			
				Amount owing at this date	51	5	0

Audited and found correct, 7th Dec., 1877, RICHARD S. REYNOLDS.

"THE NATIONAL BENEVOLENT VETERINARY SOCIETY."

TREASURER'S FINANCIAL STATEMENT.

CASH RECEIVED.	£	s.	d.	CASH PAID.	£	s.	d.
Balance of account on Oct. 10th, 1876, in bank and in hand .	842	17	9	Nov. 25th, 1877.			
Subscriptions from members from Oct. 10th, 1876, to Nov. 25th, 1877	10	0	8	Cash in bank . .	871	17	7
Bank interest: two half-years, Dec., 1876, and June, 1877 . . .	9	9	10				
Overpaid into bank .	9	9	4				
	£871	17	7		£871	17	7

Audited and found correct, 7th Dec., 1877, RICHARD S. REYNOLDS.

AMOUNTS RECEIVED FROM OCT. 10TH, 1876, TO NOV. 25TH, 1877.

	£	s.	d.
1876.			
Oct. 28th, Mr. James Carter	0	10	6
Nov. 10th, Mr. Hughes Ferguson	1	2	0
Nov. 12th, Messrs. Joseph Leather and Son, on account of trial	5	0	0
Nov. 16th, Mr. Samuel Newman	1	1	0
Nov. 17th, Mr. W. Elam.	3	3	0
1877.			
Mr. J. C. Bailey	1	1	0
„ John Howard	1	11	6
„ John Carless	1	1	0
„ William Carless	1	1	0
„ S. Withers	1	1	0
„ John Malcolme	0	10	6
„ Richard Reynolds	0	10	6
„ C. W. Elam	1	1	0
„ James Freeman.	0	10	6
„ Joseph Freeman	0	10	6
„ John Freeman	0	10	6
„ E. Meek	1	1	0
„ W. G. Schofield	0	10	6
„ Thomas Gregory	0	10	6
„ James Moon	1	1	0
„ Benjamin Cartledge	1	1	0
„ J. D. Overed	0	10	6
„ Henry Olver	0	10	6
„ John James	1	11	6
„ F. Samson	1	1	0
„ Joseph Welsby	1	1	0
T. D. Lambert	1	1	0
J. B. Gregory	0	10	6
Joseph Bale	0	10	6
„ A. C. Cope	2	2	0
„ T. G. Procter	1	1	0
„ Peter Taylor	1	1	0
„ Augustus Taylor	1	1	0
„ Thomas Greaves	1	1	0
„ W. Woods	0	10	6
„ W. Whittle	1	1	0
„ James Storrar	0	10	6
„ W. Walley	0	10	6
„ T. D. Broad	1	1	0
„ T. B. Hopkins	1	1	0
„ R. H. Dyer	1	1	0
Carried forward	£43	7	6

	£	s.	d.
Brought forward	43	7	6
Mr. W. Dobie	1	1	0
„ John Cuthbert	0	10	6
„ Thos. Pratt	1	11	6
„ T. Anderton	0	10	6
„ W. Broughton	0	10	6
„ J. L. Faulkner	0	10	6
„ T. Patteson	1	1	0
„ Alexander Lawson	1	1	0
„ James Brooks	0	10	6
„ W. Dacre	1	1	0
„ A. Rushall	1	1	0
„ John Lawson	1	1	0
„ James Carter	0	10	6
„ T. D. Broad	1	1	0
„ Gilbert Heyes	1	1	0
„ E. Nuttall	0	10	6
„ Day	1	1	0
„ James Howel	2	2	0
„ John Malcolme	0	10	6
„ Thomas Cave	1	1	0
„ F. G. Samson, £5 (returned June 12th, 1877)			
„ T. Newman	0	10	6
„ A. L. Gibson	1	1	0
„ Joseph Collins	0	10	6
„ M. Smith	1	1	0
„ W. Elam (for trial)	5	0	0
„ D. R. Scruby	1	1	0
„ Wm. Pryer	0	10	6
„ M. Broad	1	1	0
„ Thomas Taylor	1	1	0
„ E. Woodger	2	2	0
„ F. Blakeway	1	1	0
„ M. Murphy	3	3	0
„ G. H. Pyatt	1	1	0
„ H. R. Perrins	1	1	0
„ J. A. Taylor	1	1	0
„ G. Carlis	1	1	0
„ B. H. Russell	1	11	6
„ H. M. Stanley	1	1	0
„ James Collins, P.V.S.A.	1	1	0
„ John Gerrard	1	1	0
„ George Newson	0	10	6
„ G. Darwell	1	1	0
„ G. Morgan	1	3	0
	£91	10	6

Examined and found correct, 7th Dec., 1877,
RICHARD S. REYNOLDS.

STIMULANTS AND THEIR USES.

"MANY a poor animal, depressed by over-exertion or by prolonged fasting, needs a 'pick up' or cordial fully as much as his master. But he does not often get one, and his exhausted energies are successfully recruited by his ordinary food, water, and rest, or, better still, by some soft palatable fare, such as a well-prepared mash or a warm gruel. When, however, health is disturbed—when the horse returns from work, not only tired, but shivering, with appetite gone, with perhaps a hot mouth and a sore throat—a good stimulant is further indicated. At this season of the year, when horses are changing their coats, unless carefully looked after, they are apt to get weak and out of sorts; chills, colds, and influenza attacks are common, and unless nipped in the bud are often troublesome, and liable to leave damaged wind and other evil consequences. These chills, colds, and febrile attacks, are usually best combated by the warm mash or gruel already advised, by warmly clothing the body, by hand-rubbing the legs, especially if they are cold, and subsequently swathing them in flannel or hay bandages; and by applying a mustard or other stimulating embrocation to the throat, particularly if there is any difficulty or soreness in swallowing, or any redness of the visible mucous membranes. If the horse is dull and shivering, he should further have a pint of warm ale and a glass of whisky or gin, whilst competent professional aid had better be procured. Neglected colds in horses, as in other animals, are sometimes very serious. They cannot safely be treated by the bleeding and pulling-down method, which is still sometimes ignorantly adopted. With the symptoms just sketched, your veterinarian, with careful attention to diet and nursing, will probably continue small doses of stimulants—a useful class of remedies, which may be briefly described.

"Stimulants promptly but temporarily increase nervous energy. They do not give strength, like tonics or restoratives, but rather call forth dormant strength. Amongst natural stimulants are cool, dry air exercise, hand-rubbing, and warmth, variously applied. Medicinal stimulants include alcohol, ethers, volatile oils, and ammonia. They become absorbed, and may often be detected in the blood and the various secretions and excretions. They usually excite the organs by which they are removed from the body, and hence frequently exhibit subordinate actions as diuretics or diaphoretics. Those which act with rapidity—such as ammonia and others—are sometimes termed diffusible stimulants; but these rapidly-developed effects are evanescent, and can only be maintained by frequently-repeated doses. Acting as they do on so many different organs, stimulants have a varied and extended field of usefulness. Defective and irregular nervous power, depending upon debility, are the chief indications for their use.

"Stimulants are sometimes classified according to the organs on which they chiefly act and the special uses to which they are applied. General stimulants—such as alcohol, ether, ammonia, and turpentine—are of signal service in sustaining the action of the heart and the powers of life in animals sinking from sudden shock, from loss of blood, and from poisoning by sedatives and some narcotics. They are effectual in combating congestion of the lungs, caused either by exposure to cold or by violent continued over-exertion, in controlling those shivering attacks which are so often the precursors of internal inflammation, in moderating exalted animal temperature, and abating tissue waste, as in Influenza, Typhoid Fever, and other debilitating diseases.

"Cardiac stimulants, represented by alcohol, ammonia, turpentine, and digitalis, are specially indicated in failure of the heart's action from shock, profound anæsthesia, severe continued labour, or exhausting disease. Used for such purposes, they sometimes receive the special title of cordials.

"Stomachics, such as ginger and the fruits of the umbelliferæ, are stimulants of which the effects are confined to the stomach; they improve the appetite and promote digestion. Carminates gently stimulate the stomach and intestinal mucous membrane, excite contractions of the muscular coat, and expel flatus. The carminatives in general use are spirits and warm water, ether, ammonia, essential oils, ginger, aniseed, and other umbelliferous fruits, assafœtida, and other fœtid gum resins.

"Most active diffusible stimulants are anti-spasmodic. They exalt and control nervous force, and thus overcome that depressed and perverted condition of the nerves or nervous centres on which spasm depends. In combating spasm, particularly of the intestines, such anti-spasmodics as alcohol, ether, ammonia, and turpentine, are conjoined with such anodyne narcotics as opium or belladonna, or such paralysers of motor centres as conium, Calabar bean, or anæsthetics.

"Some stimulants—such as alcohol, ether, and chloroform—act especially on the brain and spinal cord, particularly when given in large doses, and after a brief stage of excitement paralyse sensibility and consciousness, and form the connecting links between stimulants on the one hand and narcotics and anæsthetics on the other. Some stimulants act specially on the motor centres and nerves, excite, and in large doses tetanize, voluntary muscle. The representatives of this class are nux vomica, strychnine, benzine, thebaine, codeine, and theine. They are given in Chronic Paralysis and in Epilepsy, and Chorea depending upon debility.

"Stimulants such as belladonna, hyoscyamus, digitalis, and ergot, with their active principles, directly excite the sympathetic nervous system, and, besides sustaining the force and power of the heart, stimulate other involuntary muscles, control spasm, rouse the vaso-dilator nerves, and counteract capillary congestion and stasis. Belladonna, hyoscyamus, and stramonium, three solanaceous plants, with their active principles, besides more general effects, exert a special stimulant action on the sympathetic ganglia and nerves of the eye, consequently dilate the pupil, and are useful in ophthalmia, and in examination of the interior of the eye. Ergot of rye is a general constrictor of the bloodvessels, and is accordingly used for the arrest of bleeding, whilst it also specially stimulates the uterus, inducing its contraction and the expulsion of its contents."—*North British Agriculturist.*

ADDRESS ON RABIES AND HYDROPHOBIA.

DR. ACLAND, Regius Professor of Medicine in Oxford University, delivered a lecture on November 30th, in the museum of the University, on "Rabies and Hydrophobia." The theatre was crowded. Among those present were, the Vice-Chancellor, the Dean of Christ Church, Professors Max Müller, Rolleston, Ruskin, Smith, and Dr. Freeborn, and many citizens.

Dr. ACLAND said: "It is known to many, I doubt not, that shortly before his death Brodie, the great surgeon, sent to me the parting charge to deliver in Oxford from time to time lectures which should explain in a simple way the principles by which health is maintained in a community. By lectures on National Health, on Sanitary Law, Sanitary Administration, Administration of Hospitals, Construction of Healthy Dwellings for the Working Classes, and in other ways, I have endeavoured to lay a broad foundation for this design. Now I take a restricted but pregnant subject, in accordance with the wishes of some whom I trust, as likely to be acceptable to the University. It has this further interest—that it is a subject within the domain of that great

department of biology, 'General and Comparative Pathology,' whose exposition is so urgently and increasingly needed, and for which I have once and again pleaded that a Chair should be founded at Oxford. The object to be attained is to show what Hydrophobia is, and how it comes to exist,—1. How it acts; 2. How it is spread; 3. How it is to be prevented. We look at these from a general rather than from a medical point of view. Hydrophobia, as all know, is the result of an animal poison operating on man. What does this mean? What are animal poisons? Whence do they come? How do they operate? The subject of Animal Poisons is one of strange—nay, of fascinating interest. It is so extensive that, if pursued in detail, it would wholly exhaust the patience of any who had not a special purpose in pursuing it in its manifold particulars. Some idea, however, may be very quickly gained. We are each of us constructed on a definite plan, the outcome of we know not how many myriads of ages operating under defined conditions by regular laws. We have a certain form which varies according to the race from which we spring. We are composed of matter much the same in all human beings, but little varying in all that enjoy animal life and consciousness. How strange, then, that this family, so knit up, should find in it members whose *rôle* seems to be that of bringing instant destruction to those about them for no purpose that we can see, neither for self-defence, nor for self-maintenance by way of food! Poisons, no doubt, surround us. We have heard enough of late of poisoning air, poisoning water, poisoning food, poisoning soil. The strangest of all is, that animals exist who themselves generate them for the sake of poisoning. Much of the poison which surrounds us is created by ourselves; its origin, therefore, may be to a great extent prevented by ourselves. But some poisons we cannot hinder. For instance, the poison of snakes. It is the simplest case of an animal communicable poison. No manner of life can hinder the snake from manufacturing his deadly dynamite, nor from using it when manufactured. The secreted poison which the dog emits when himself affected by Rabies, does not produce on man the same results which it produces on the dog; and it might be suspected, therefore, that there is something wild and uncertain in the *modus operandi* of a poison. It is not so. It has been well said by a classical writer that there are three important laws of poisons: 1. That all have certain definite and specific actions; 2. That they lie latent a certain but varying period of time before these actions are set up; 3. That the phenomena which result from the poison, when roused into action, vary according to the dose and the condition or special character of the victim. In illustration of the first of these laws, we may cite so familiar an instance as that Scarlet Fever will not produce Small-pox. As to the second—that a poison may be latent only a moment, as in the poison of prussic acid and the poison of the cobra, before the symptoms are set up; or it may be latent definite days, as in Measles; or uncertain (weeks, months, or even years), as in Hydrophobia. As to the third—temperament, the state of health, the mode of life, the race, the animal, the inheritance, as well as the nature of the poison itself, produce remarkable variations in the actions of some poisons. How does snake poison act so as to produce its terrible results? 'Snake poison,' says Sir Joseph Fayrer, 'is essentially a narcotic, and when it takes full effect it kills by annihilating the source of nerve force, in ways which bid fair to be elucidated by modern investigation.' I have to draw your attention to some microscopic preparations bearing on this subject which have been most obligingly brought for your inspection by my son from Dr. Gowers, Dr. Savage, and Dr. Greenfield, to whom I much desire to express my due obligations. It has been shown that the effect of such virulent poison as that of the cobra is—1st, by introduction into the blood; 2nd, by affecting nerves either at (*a*) their periphery, (*b*) their course, (*c*) their centre. It would

seem by various experiments, and by observations of cobra-poisoned animals and men, that the motor nerves alone, or the spinal cord (*i.e.* the centres), or the brain, may be each affected. But it would seem that cobra poison hardly affects the sensory nerves. Now, the poison created by the dog, our companion and friend, is in another category. It is not natural to him: he is himself a victim; the poison he transmits he has received. It works almost certainly his own destruction. He spreads it often without intention, sometimes without knowledge. Man perhaps helps to cause it in him by his treatment of him. It is a consequence of his faithfulness, and of his domestic relations, and of his familiarity, that he inflicts the injury on his master. The Rabies, which is his torment and curse, brings about the Hydrophobia in his protector and guardian. It lies with man to save the dog from the sickness which, once engendered, rebounds with terrible force on the human family. What, then, is Rabies? and how does Rabies arise? Probably never spontaneously; or if ever it does so, it is certainly with extreme rarity. It is communicated from one rabid animal to another animal, which becomes rabid. Whether it ever does originate except by communication is a question belonging to the interminable controversy of spontaneous generation. Many cases of detailed history might be quoted from the vast literature on this subject,—a literature the extent of which, from Aristotle till now, would surprise many. You may be referred to Youatt's work, or to the admirable and exhaustive writings of Fleming, the industrious advocate of the study of Comparative Pathology. We must apply to death from Rabies the same general principles as to death by snake bite; but in the one case the poison is transmitted at once, in the other it may lie dormant for years. It lies dormant probably by being entangled in the original seat of the wound. We must next pass on to the general geography and statistics of Rabies; and by the aid of some returns before you, I point out to you how few the numbers are as compared with the statistics of snake bites, or a disease like Cholera." [Here Dr. Acland explained and commented on various statistical diagrams, and a chart of the world showing the known habitats of Rabies.] "It remains to compare the effects of the dog poison on man with that of the cobra. There are points of similarity and points of divergence. The points of similarity are that the poison, if allowed to enter the circulation, is uniformly fatal; and secondly, that the fatal termination seems certainly to be by way of the nervous system. We are not yet in a condition to say with absolute precision what are the anatomical changes in the nervous system, either in man or in animals not man. But observations are rapidly accumulating. It is certain that in each case the injury arises from the introduction of the animal poison into the circulation. In each case, therefore, the end can be averted only by keeping the poison out of the circulation; or if in it, in a moderate quantity, maintaining life till it can be eliminated. The nervous symptoms in man, when once the poison has fairly entered the system, generally increase until the thirst and inability to drink remove all doubt as to the only result. The inability to drink is but a sign of deep-seated changes in the nerve structure. Professor Rolleston has pointed out to me that these changes, though hardly discernible, may be so great—having regard to the actual character of the force-producing nerve cell—as to explain entirely (1) the excitement, and (2) the destruction of the ordinary functions of the nerve centres which regulate life. In a paper to which the Professor referred me, by Dr. Mayor, I find it noticed that 'there may be differences between these delicate structures in man and other animals so slight as to be nearly unappreciable, but still differences of the widest significance and importance,' and so it may quite be that fundamental changes may take place by sudden shock or otherwise in the fine structures by which the nerve force is developed in man, and yet the physical changes may be wholly outside the reach of our

observation." [Having drawn a diagram to explain the effects which he had described, Dr. Acland continued],—"Hydrophobia occurring in man after communication of Rabies is thus shown to be a Toxoneurosis. It would not be desirable, nor would it be of use, before a mixed audience, to enter on a description of the symptoms of this form of death. I have thought it best rather to illustrate the nature and character of the malady in other ways. By favour of Dr. Gray, I some time since saw a case under his care in its latest agonies. But I forbear to describe it. We must admit that there is, as yet, no cure known for the disease when once established in man. The most extravagant remedies have been suggested. Every form of pharmacy and charlatanism has extended itself throughout all generations, advocated sometimes by even otherwise great names. But it is almost certainly preventable by prompt measures taken at the time when the injury is inflicted. The weight of evidence seems to show that the actual cautery is the most efficacious measure, excision the next, and caustics, though sometimes sufficient, are the least to be relied upon. I must advert to statements in the *Times*, and in other journals, to the effect that a case had been cured by means of the Wourali poison, by Dr. Offenberg. This is not the only case adduced. Another is reported from America. With respect to Offenberg's case I must own that, from information I have received from Germany, through the kindness of Dr. Victor Carus, an honoured D.C.L. of this University, I am by no means satisfied that it was a true case of Hydrophobia. Of the American case I cannot even say so much. Yet there is enough fully to justify, nay, to demand the trial of the potent agent. Of all the efforts of scientific medicine it will be one of the most remarkable should it turn out to be successful. The remedy itself is a terrible instrument. I received in the evening of Saturday, November 10th, a letter from the Infirmary in this place, saying that a boy had been brought there with the dread, if not with the signs, of Hydrophobia. He had been bitten in the hand by a dog three years ago, and two years ago in the leg. A pustular eruption the size of a shilling had just appeared at the seat of the bite on the hand, where was always a small scar. All concerned were in great alarm. On this seemingly simple matter some difficult questions arose:—1. Could the period of incubation, if the dog had been mad, be five or even two years?—On the historical evidence, Yes. 2. Would an eruption be likely to be the precursor of true Hydrophobia?—Yes. 3. If the genuine symptoms appeared would the boy recover?—Unless the alleged cases of cure by giving the Wourali poison were true, then, after the symptoms arose, death within four days was certain. 4. Can a person die of fright with spurious symptoms of Hydrophobia?—Yes. How simple, how strange, these questions and answers! Yet this is the issue raised in every case that occurs of dog bite, where the end of the dog is, as in this instance, unknown. It was, therefore, necessary to have Wourali prepared, so that it could be relied on. By the kindness of Mr. Yule, a solution of definite strength, with known and certain results, was instantly made. The symptoms, however, subsided. I will now come to what I think, under all circumstances, should be done in the way of general prevention. First of all, the State should impose a rigid dog tax, and should compel every dog to have a collar with the name of the owner and the number of the license; secondly, all dogs so unregistered should be mercilessly destroyed, if found in the street; thirdly, no importation of dogs should be allowed from foreign countries for a certain time, excepting under special conditions; and lastly (which is a suggestion of Mr. Fleming's), everybody, when he takes a dog license out, should be given instructions as to what should be done in case of dog bite. Thus, I have endeavoured to give a sketch of a disorder which has caused too much anxiety to many. Nothing can divest the subject of its wide and weird interest. Yet nothing can be more reassuring than

the knowledge of how entirely it may be brought under control. The marvel is that we are, and have been, so careless. You may prevent, you cannot cure. This word has been the message of medicine in the present age to man in more things than the poison of Rabies."

At the conclusion of the address, important and beautiful microscopic preparations were exhibited. By these it appeared that already scientific investigation is demonstrating, by aid of the most skilled microscopic appliances, the actual mechanical changes produced by Hydrophobia in the nerve tissues of the respiratory centres, in the medulla oblongata, and elsewhere in the nerve centres.

We have been unable, from want of space, to give the whole argument, or the passages quoted from various authors. The foregoing is a general summary of the address.

IMPORTATION OF LIVE STOCK FROM THE CONTINENT.

OUR readers are undoubtedly aware of the position we have long maintained and the views enunciated, both in this journal and in the public press, with regard to the measures necessary for the prevention and suppression of contagious diseases among the domestic animals. We have for many years insisted that it is worse than useless attempting to get rid of these diseases, which do such terrible damage to our agriculture and cause such serious loss to the public in this country, so long as we allowed the ingress of live stock from infected countries, and therefore incurred the risk of repeated introduction of these maladies from abroad. Port inspection we have shown to be unreliable, while slaughter at the port of debarkation—even with the exercise of all possible care and viligance—will not confer absolute safety. In proof of the latter assertion, we refer to the last invasion of Cattle Plague. Under these circumstances, and not without due consideration and weighing of the arguments *pro* and *con.*, we concluded that the largest measure of safety was to be found in limiting the food supply from foreign sources to that of dead meat—the animals to be slaughtered and their carcases dressed on the other side of the Channel. Not only would this reduce the danger of receiving contagious diseases to the lowest degree, but it would also be more profitable to the exporter, better in some respects for the consumer of such flesh, and also prove far more humane to the animals themselves, as they would then be spared much fatigue, if not positive cruelty in transit to our shores. The question was, and is, one which involves several important interests, and comes quite within the domain of veterinary sanitary science and police; it has received much discussion, and some authorities have even asserted that the importation of live stock from the Continent is absolutely necessary, and that, if prohibited, consumers of flesh would suffer from enhanced prices, scarcity, and other evils. We had no fear on this head: trade has a marvellous way of accommodating itself to circumstances, and we felt certain that neither producers nor consumers would be inconvenienced, but, on the contrary, would be benefited in time,—in fact, we anticipated that in a few years we should look back with astonishment and dismay at the then wasteful, inconvenient, unreasonable, and cruel mode of supplying meat from foreign sources to our population. The fears and dismal prognostications of those who adopted the opposite view, and maintained that we could not dispense with the importation of live cattle, has, almost in a few months, been proved to be unfounded; and as time goes on, the proof that we were correct in our estimate will become stronger and more evident. In the meantime we

would draw attention to the following remarks by the *Times*, which will show that, as on many other occasions, our predictions have not been baseless or exaggerated:—

"The prohibition of the importation of live cattle from a large portion of the Continent, made imperative this year (1877) by the arrival of infected cattle from Germany, has not diminished the supply of fresh meat for the United Kingdom, nor has it raised prices, even in London, which believed itself dependent for about a third of its beef and mutton upon arrivals of foreign animals. The trade in foreign animals has not been destroyed, and the decrease in importation has not confirmed the apprehensions expressed on behalf of consumers last spring. The number of cattle, sheep, and swine which we received from abroad in the ten months ended the 31st October, this year and last, appears thus, as arranged from the Trade and Navigation Accounts :—

	1876.	1877.	Decrease in 1877.
Oxen and bulls	149,584	131,915	17,669
Cows	51,712	23,169	28,543
Calves	41,286	28,279	13,007
Total cattle	242,582	183,363	59,219
Sheep and lambs	912,835	763,669	148,866
Swine	40,176	18,630	21,546

"In ten months the decrease in the number of oxen and bulls, most of them slaughtered at once for meat, and a small proportion sold to be grazed and fattened, has been only 17,669, or 11¾ per cent. Cows, which come principally to be milked or grazed before they are sent into the meat market, fell off in number more than one-half; but a loss of 28,543 Dutch and other cows is immaterial in connexion with the total supply of meat. The decrease in calves was 13,007, or nearly a third. Sheep and lambs were 148,866 fewer than in the corresponding ten months of 1876, being a decrease of nearly a third; and the imports of swine fell off 21,546, or somewhat more than half.

"What we lost in weight of meat by this decrease in the number of foreign animals imported may be estimated with a fair approximation to the truth. Extensive inquiries into the probable average dead-weights of animals have been made by Mr. C. S. Read, M.P., Mr. James Howard, and Mr. John Algernon Clarke; from which it appears that, with a moderate valuation, we may take the general average dead-weight of imported oxen and bulls at 5¾ cwt., of cows 5 cwt., of calves 1 cwt., of sheep and lambs ½ cwt., and of swine 1 cwt. The estimated dead-weight of foreign animals imported in ten months ended October 31st, in 1876 and 1877 respectively, will stand thus:—

	Average dead-weight per head. cwt.	1876. cwt.	1877. cwt.	Decrease in 1877. cwt.
Oxen and bulls	5¾	860,108	758,511	101,597
Cows	5	258,560	115,845	142,715
Calves	1	41,286	28,279	13,007
Total cattle	—	1,159,954	902,635	257,319
Sheep and lambs	½	456,417	381,984	74,433
Swine	1	40,176	18,630	21,546
Total weight	—	1,656,547	1,303,249	353,298

The total decrease in weight of meat imported as live animals in the last ten months was, according to this estimate, 353,298 cwt., or scarcely more than a fifth below the quantity in the corresponding period of 1876.

"Now, it is very satisfactory to find that this diminution of supply was far more than compensated by a great increase in the arrivals of fresh dead meat. In the ten months we received as follows :—

	1876. cwt.	1877. cwt.	Increase in 1877. cwt.
Beef, fresh or slightly salted	96,847	412,034	315,187
Meat unenumerated, principally fresh mutton	66,198	93,433	27,235
Meat preserved otherwise than by salting	208,363	388,465	180,102
Fresh pork	20,309	7,712	(less) 12,597
Total	391,717	901,644	509,927

"The shipments of fresh dead meat from abroad have increased 509,927 cwt., or no less than 130 per cent.; and while we have lost 353,298 cwt. of fresh meat in the shape of live animals, we have gained 509,927 cwt. of fresh meat, which has come ready killed in hampers, packages, cloths, or tins.

"Already the quantity of foreign fresh meat coming to us dead is considerably over half as much as that coming to us alive; the 901,644 cwt. of fresh dead meat received in the last ten months being 54 per cent. as compared with the 1,656,547 cwt. of live animals imported in the corresponding months of 1876, before the Cattle Plague restrictions were put on; and, at the present rate of increase in the dead meat trade, the quantity of foreign fresh meat brought to us dead will in less than a year reach the total weight of that brought to us alive.

"The supplies of foreign salted meat have but slightly increased. In the period referred to there has been a considerable falling-off in the imports of bacon, of salted beef, and of salted pork, though the weight of hams is very much more.

"Taking both salt and fresh meat, the total weight of dead meat imported into the United Kingdom now exceeds the estimated dead weight of all the live animals imported. For in the ten months of 1877 we have received 790,915 cwt. of salted meat, and 901,644 cwt. of fresh, of slightly salted, and of preserved meat—making a total importation of 1,692,559 cwt.; whereas the estimated dead-weight of the live animals imported in the ten months of 1876, before the imports were published, was 1,656,547 cwt.

"Of course the foreign supply of live and dead meat together bears only a small proportion to the quantity produced by our home breeders and graziers."

TEXAS FEVER.

To the *American Veterinary Review* for November, 1877, Veterinary Surgeon J. Myers, of Cincinnati, Ohio, contributes an interesting paper on the peculiar and somewhat obscure disease known as "Texas Fever," which has recently been prevailing somewhat extensively in some parts of the American continent, as we intimated in the *Veterinary Journal* for last November. Seeing that live cattle are now imported into this country from the United States, it is imperatively necessary that everything relating to the contagious disorders of stock on the other side of the Atlantic should be known here. We therefore consider this, the latest contribution to the literature of the disease, worthy of transference to our pages.

Mr. Myers writes: "The scrupulous management of the sanitary police ordination on the Eastern Continent partly, and partly the contemplated

exportation of American cattle, induced me to draw the attention of the veterinary profession to this enzoöty,—viz., Texas Cattle Plague, Texas Fever, Spanish Fever, or Splenic Fever,—the propagation of which is thought to be due to contagion. The virus is generated within cattle of the Gulf region (being endowed with mysterious properties), and is transmitted by them in the eastern and central States, where they spread the disease among the cattle with which they come in contact, while their own health remains unimpaired. Considering these circumstances, it is quite probable that the authorities of such districts in which foreign cattle are unloaded, will enforce protective measures against the invasion of plagues; and, moreover, should one or more among a lot of these bovine emigrants prove indisposed—which is very likely to be the case when such dumb animals as have never been incarcerated before are doomed to a fortnight's rail or sea journey—they would make their inspection with even more precision. As to the extent to which such sanitary precautions are necessary, the following facts in reference to the disease may be taken into consideration. Incomplete as they are, I deem it justifiable to communicate fragments, expecting by these means to stir up scattered relative substance, which might in the end serve as a foundation of trustworthy instruction as to how this evil might be prevented or cured.

"SYMPTOMATOLOGY.—This disease, which is compared with, or even identified, as Anthrax, is characterized by the painless evacuation of a reddish-black, sometimes coffee-coloured, turbid, though not always abnormally-odoured, urine; this, after standing for twenty-four hours, throws down a brick-coloured precipitate, which is sometimes streaked with blood. At the same time the secretion of milk is suspended,—a circumstance which first attracts the owner's attention. Rumination is suspended, and food is refused, though there is a moderate desire for water. The patient remains apart from the other animals in the herd, with hanging head, ears drooping, viscid saliva flowing from the mouth, mixed with mucus from the nostrils, muzzle moist, an inconstant discharge from the eyes, and the conjunctivæ pale, with the larger vessels prominent, but not engorged. At the commencement the temperature is increased, then fluctuates, and finally decreases. When the animal is standing, the limbs approach each other; in the recumbent position they are flexed, the head being extended, with the lower jaw resting on the ground; if an unsuccessful attempt is made to get up, the animal falls again upon its side. During the first stage the gait is "dragging," gradually becoming unsteady, and at last altogether impossible—indicating a complete collapse of the nervous and physical force. The mucous membranes, particularly that of the buccal cavity, present a greyish hue; deglutition is sometimes impaired; the fæces at the commencement are soft, and occasionally streaked with blood—the colour depending upon the kind of food previously consumed; and if the patient lingers for a number of days the consistency is changeable; the peristaltic movements are evidently sluggish, but symptoms of Colic pains have never been observed. The frequent respirations are sometimes accompanied by cough and moans, though without any energetic action of the abdominal and thoracic muscles. In the majority of cases the circulation keeps pace with the respiratory acts—the pulse numbering from 80 to 120 per minute—and as it increases it loses its tonicity. The action of the heart is, in general, scarcely perceptible.

"About two-thirds of a pint of blood drawn from the jugular vein more resembled arterial than venous blood; it coagulated within ten minutes, the supernatant serum being of a reddish-yellow tinge. It must be understood that the symptoms are not at all times the same, they being dependent upon the progress of the case. The most important diagnostic symptom is the character of the urine; but since we are unable to be present personally at all times, the history of the case as given by the attendant (however unreliable

it may occasionally be), must suffice, and is indispensable unless previous cases appeared in like manner, and which, of course, must be traced in the same way.

"PATHOLOGICAL ANATOMY.—In one instance I observed *post-mortem* rigidity, which I did not notice in others. Tympanitis, as well as emphysema, I noted only in such cases as had been dead for several hours; while in those which had just expired there was collapse of the abdomen. The bloodvessels of the subcutaneous tissues were very seldom engorged. In some cases the muscles were pale, and in others bluish-tinted. The adipose tissue usually presented a healthy aspect, though in some instances it was yellowish-coloured. The abdominal cavity generally contained from one-half to one pint of serum. The external surface of the stomach often had an abnormal appearance; where it was in contact with the liver it had a yellow hue, and with the spleen a sanguineous tint. The rumen was nearly always very full of food; the reticulum was either partly or entirely empty; the omasum was filled with the usual quantity of dry food, though in exceptional cases it was empty; and the abomasum nearly always contained an offensive 'mashy' mass. The contents of the ileum, cæcum, and colon were in nearly every instance of a like offensive character; and dry, oftentimes bloody fæces were found in the rectum, unless death occurred during purgation. The external aspect of the alimentary canal seldom afforded any evidence as to its interior, the tinge being usually yellow. In those animals which had been destroyed the mucous membrane showed traces of inflammation, while in those which had died it was partially detached, had a greyish hue, and the denuded muscular coat was congested; the mucous membrane of the small intestines was softened, covered with bloody mucus, and the intestine itself was distended with gas; Peyer's patches were enlarged and livid. The internal coat of the large intestines, as well as a portion of the ileum, presented circumscribed greyish-green or yellowish patches, which had a gangrenous odour. The latter change was not observed in those cattle which were destroyed; in these the liver, in the second stage of the disease, was merely enlarged—indicating the existence of acute or sub-acute inflammation; in those which died, this organ was generally found to be undergoing decomposition; externally, it was either of a yellowish, brownish, or brick colour; the veins traversing it contained a small quantity of purple-tinted blood. The gall-bladder was usually filled with dark-coloured bile of the consistency of honey, or a more normal fluid of a yellow or greenish colour. In destroyed cattle the spleen was enlarged, its texture only slightly altered—in fact, it was merely in a state of hyperæmia. In those which died it was more voluminous and emphysematous, and its pulp was semi-fluid and viscid, something like decomposed blood. The lumbar and iliac glands in two cases I found considerably enlarged, and in a decomposed state. The colour and texture of the kidneys were varied; the parenchyma of those destroyed at the commencement of the disease presented a hyperæmic, slightly swollen, dark-red, but compact appearance; while in those which died it was quite black or dark-grey, softened, and apparently at the point of dissolution. The bladder, in the majority of cases, was filled with a blood-red or coffee-coloured urine, which readily responded to the tests for albumen; and the mucous membrane was relaxed, though there was no trace of inflammation. The lungs were generally healthy, the few exceptions showing that the inflammatory alterations were caused by irrational drenching, these being traced as high as the larynx; in such cases not only was the lining membrane of the trachea, but also the subjacent muscular and cellular structures were infiltrated with blood. The heart was pale and flaccid; and in one case the endocardium was ecchymosed on the right, in another on the left, and in a third on both sides; in those which died, this organ contained ash-grey and dark-coloured fibrinous clots. In a few exceptional

cases the pericardium contained several ounces of serum. The vena cava usually contained small quantities of blood or clots, some of which, on account of their consistency and discoloration, might have been taken for pathological products.

"The analysis of the blood, undertaken by order of the Board of Health, did not yield any satisfactory result. In order to satisfy my own curiosity, I requested an expert to examine such blood microscopically—suspecting blood changes, as in Anæmia, Leukæmia, and the like; but he naïvely informed me that he was only acquainted with the analysis of human blood. The symptomatology of this disease, as described in the handbooks at my disposal, differed from that of my cases; therefore I was the more anxious to know with what I had to deal.

"The progress of this disease is rapid, the majority of animals expiring within two and a half to four days; in exceptional instances it extended to seven and eight days. The course of the malady appeared to be governed by variations in temperature; I, at least, observed that animals attacked in the months of July and August ran a more rapid course than those affected in September.

"ETIOLOGY.—Some individuals claim this as a mystery; others assert that it is originated by direct contagion communicated by cattle transported from the Gulf regions; but cases have come under my observation in which I was unable to trace any contagion, and which had all the evidence of spontaneous origin. For this reason I cannot agree with the aforesaid assertion unconditionally; although we have sufficient proof that cattle running at large, or in pasture where they may come in contact with the Texas cattle, are more readily exposed to infection than those kept in stables; and from May until October exclusively, and less in wet than in dry seasons, when the scarcity of fresh good water compels them to quench their thirst with stagnant water. In this way numberless infusoria, and other matters deleterious to health, are conveyed into the system—the result being a contamination of the chyme, the composition of which, besides the withered grass, consists of innutritious and even toxic vegetation (as when animals desire to refresh themselves with something cool and juicy, they will eat plants and drink water which at other times they would refuse), thereby infecting the alimentary canal and its associate organs. The injurious effects are not confined to the vascular system alone, but extend to the adenotomic organs in the abdominal cavity. The organs are important agents in the formation and purification of the blood, and therefore, becoming impaired as soon as these obnoxious ingredients arrive for transformation or elimination, injury is inflicted not only on the glands themselves, but on the entire organism. All this may, under favourable conditions, be sufficient to develop an infectious germ; and in this way we may have spontaneous cases of the disease, which carry the virus wherever the sick animals may be carried—whether among the mature bovine inhabitants of hilly countries, or those of lowlands and valleys, or creek and river precincts, particularly those districts influenced by the tide.

"Whether the infective principle is fixed or volatile, and what its *modus operandi* is, remains to be ascertained. Considering the locality in which the disease most frequently appears, we are obliged to attribute some share to miasmatic influences. The evidence before us inclines us to believe that the system of southern stock must be impregnated with the effluvial atmosphere prevailing in that climate. This may account for the inviolability of that stock, and the tenacity of the virus which our native stock inhale from their excrements. Even the expirations may be charged with poison, and will act as such in the summer if the animals change their home to any north-eastern States. It is also asserted that they are subject to infection after becoming acclimatised.

"Not having anything important to add to this miasmatic topic, I do not hesitate to acknowledge my predilection for the germ theory, which accounts for the otherwise mysterious sweeping away of entire herds, dairies, etc., within a week or two. Innumerable statements as to such mortality are made in agricultural reports and periodicals; but the sporadic outbreaks are almost entirely ignored. To prevent the disease, it is necessary, in the first place, to examine thoroughly into its causes and nature; the latter is a problem yet to be solved, but must not be neglected if prophylactic measures are to be instituted with a view to prevent such calamities. My experience of the disease prevents me giving a positive opinion as to its period of incubation; but from two days to five weeks seems to be the average time the poison requires to develop the disease.

"The prognosis is unfavourable, especially in midsummer. With regard to treatment, no remedy has, as yet, given satisfaction. The salicylic and carbolic acids, with some mucilaginous infusions, seldom did any good. Bromide potassa, with glycerine, and extract encalyptus globulus and water, proved to be no better; nor did quinia give any more favourable results. Fomenting the abdomen with warm water, and also applying mustard or red pepper thereto, were also resorted to. I must, however, admit that all my therapeutical experiments were unsatisfactory; the rapid course of the disease, and lack of time to give proper attention to the action of medicines, frustrated a systematic procedure.

"It appears to me likely, if not certain, that this morbid condition is dependent on an acute decomposition of the blood (*sepsis sanguinis*), chiefly manifested in the abnormally-coloured urine, the coloration being due to some liberated hæmatin and cholochrome. The malady appears during the hot summer months.

"Calves and other ruminants have been exempted from it. A superficial examination of the disease at once shows that its analogy with Anthrax is untenable. Yet Mr. Fleming, in his excellent work on 'Sanitary Science and Police,' favours this idea. I also express doubt as to paragraph 4, page 212, vol. ii., in that work, which states as follows: 'Animals receiving the infection from southern cattle do not communicate it to other natives,' etc. I have no positive proof to the contrary; but in order to caution interested individuals, I deem it necessary to cite two instances which will not correspond with the assertion of Mr. Fleming. Two years ago, at midsummer, a farmer, Mr. Hamilton, near Hamilton, Ohio, made a contract with two drovers to supply him with neat cattle, *home-bred*. They fulfilled their engagement so far as two lots were concerned. The second transport arrived two weeks after the first. Two days after the second lot arrived, one of them became ill and died. Twenty-four hours subsequently, one of the first lot was also attacked, and succumbed in two days. From this time forth one or two were affected every day, without distinction of lots, until the drovers took away the remaining ten of the last lot, the others apparently mending. A repetition of the same occurrence took place at a distillery in my neighbourhood. All went well until the second division was installed,—when sickness set in; but owing to the low temperature which came to their rescue, only four per cent. were lost. In this last instance we see the malady break out in the stable; the animals are fed on hay and corn-swill (seldom heard of); and in both instances the native cattle have been apparently disseminating the ailment among themselves. Not having evidence as to whether one or all have been infected by the Texas stock, I leave it to others to make their own comment."

In addition to the above paper on this destructive malady, there is an excellent article in the American *Live Stock Journal* for November, from

the pen of its able editor, we presume—Professor Law. The importance of the subject to this country compels us to reproduce this notice.

"While the season for the development of new cases of this disease has been virtually closed by the supervention of frost, it would be unwise to forget our recent experience, and to ignore the fact that the same will be repeated year by year, with increasing frequency and a progressive mortality, unless measures are taken to keep it in check. The present year is the worst we have experienced since 1868; but by no means the worst we are likely to endure, if we maintain our present *laissez-faire* attitude in the matter. In short, we are exactly repeating the history of the cattle and Texas Fever trade, which ensued upon the close of the war. Peace naturally brought a large influx of cattle from the south; and, as stock was specially wanted in summer to feed on the luxuriant pastures, the transfer took place mainly in the warm season. The southern stock did well on the northern pastures, and liberal profits led to a wider and wider extension of the traffic, until the long-horned Texan steer became an every-day visitor in the slaughterhouses of all great northern cities. But it was soon found that where these Texans had grazed the pasture was poisoned for all northern stock, and that even the roads they had travelled were contaminated with a deadly virus. This state of things culminated in the long, hot, and dry summer of 1868, in which year the mortality in the Northern States exceeded 15,000 head, at a value of half a million dollars. Threatened with ruin, the owners threw upon the markets the remainder of those herds in which the disease had shown itself; and the inevitable spectacle of sick, dying, and dead cattle on the roads, in the railroad cars, in the stock-yards, in the public streets of cities, and in the abattoirs, startled the average citizen, and roused the gravest apprehensions as to the sufficiency and wholesomeness of our meat supplies. A panic ensued; the subject was investigated by boards of health and Cattle Plague commissions, and the result was a wholesome regulation of the dangerous traffic. The middle and northern States enacted laws forbidding the importation of southern cattle, excepting during the frosts of winter; and for some years a comparative immunity was secured.

"But this immunity has bred carelessness. In some cases the protective laws have been allowed to expire by limitation, and all efforts to render them permanent have met with the strongest opposition; in others they have simply been forgotten or ignored—a steadily extending disease has virtually abrogated them—and southern cattle have invaded the northern pastures in yearly increasing numbers. To this the increasing facilities of transit, by reason of continuous railroad extension, have largely contributed, and we are now rapidly approaching a second general diffusion of the disease. In 1876 the outbreak again appeared, and several localities in the State of New York, and even New England, suffered—considerable losses having been sustained around the city of Worcester, Mass. In 1877 the progress has been much more manifest. Besides the extensive losses in Central Illinois, and at Cleveland, and other places in Ohio, the virus has been carried into numerous places in New York, Canada, and New England. The Cleveland outbreaks appear to have been largely dependent on the interruption of railway communication with the east for a few days during the strikes in July, and supply a very instructive lesson as to the extent to which the trade in southern cattle has grown. If the cattle stopped during a few days of suspension of traffic could scatter the germs of disease and death over the pastures generally in the vicinity of Cleveland, what is to be expected from the whole numbers carried in the course of the summer! What has been mainly instrumental in saving us is that most of these cattle have been sent on for immediate slaughter. The outbreaks in New York have been chiefly where butchers have been tempted to engage pasturage for their animals for

a few days, until they should be ready to kill. This was the case at Brighton, Monroe County; North Bangor, Franklin County; Waterton, and Schenectady. Of the outbreaks in Canada and Washington County, Vt., the evidence is not so clear.

"A development of the disease at Big Flats, Chemung County, N.Y., points to another and far more serious danger, attendant upon this traffic. A farmer bought in Buffalo a herd of steers, purporting to come from Wisconsin; and, a week after their arrival at his farm, a number sickened with Texas Fever. The steers in question had clean hides, entirely destitute of ticks; and having taken ill so soon after their arrival, they furnish strong presumptive evidence of having been selected from an infected herd, cleaned of their parasites, and thrown on the market to save further loss to their owner. Instances of this kind will continually crop out, wherever a communicable disease is allowed to maintain a foothold in a country,—as by this means the unscrupulous can turn their losses, to a large extent, upon innocent victims. Then a disease like Texas Fever, in which the poison remains latent and unsuspected for several weeks in the system of the already infected animal, affords the most favourable opportunity for perpetrating such unworthy tricks with impunity. This is the most common mode by which contagious diseases are spread; and great extensions of these affections are confidently looked for in Europe after the large yearly markets for store cattle.

"Though much has been written on the subject of Texas Fever, still more remains to be discovered by a careful experimental investigation into its causes and phenomena. We know it as a disease in which the blood and other fluids of the body contain germs of a fungus, in which the blood particles (globules) break down, and diffuse their colouring matter through the liquid portion, as well as into the urine and bowels; the liver is congested, and the elements of bile pass into the circulation and stain the tissues; the spleen is gorged with black, tarry blood, sometimes almost to rupture, and the digestive organs (notably the fourth stomach, the small intestines and the rectum) are the seat of stagnation of blood in the capillary vessels, extreme redness, softening, and even ulceration. But we do not know the exact pathology of the disease: whether the vegetable germs are the cause of the disease, or mere accidental attendants upon it; whether the poison is confined to the digestive canal or diffused through the blood and system at large; why it is that sucking calves escape, though sucking several sick cows in succession; and why the disease is rarely or never transmitted from one diseased beast to another in the north. At first sight, these may appear unimportant questions, inasmuch as we know that the danger consists in the bringing of northern cattle in contact with those from the south, or with the pastures, roads, yards, boats, cars, etc., previously occupied by these; and that little danger attaches to mere proximity, since a fence will usually form a sufficient barrier to the virus. But, on the other hand, a system of prevention which is founded on a knowledge of the true nature of the disease and its modes of propagation would probably be much more rational, efficient and economical than one which is merely empirical and founded on the observation of effects rather than on an acquaintance with the causes.

"That the disease is not developed by ill usage on the passage north, as some claim, is abundantly evident, for it is not the travelled and abused cattle that suffer, but the northern beasts, to which they bring the poison; and we have abundant evidence that the strange cattle taken to the coast of the Gulf of Mexico, or to the islands in the Gulf, are mostly cut off by this affection soon after their arrival. The poison is certainly indigenous to the region in question, and respects the native cattle to a very large extent, merely because they have become acclimated and fortified against its attacks

by the 'survival of the fittest,' while the more susceptible families have been cut off.

"*Preventive Measures.*

"In the present state of our knowledge, our safety consists in preventing the introduction of southern cattle into the northern States, excepting during the continuance of frost. How far north the proscribed area should extend, it is difficult to decide. The 35° of north latitude has been suggested as the limit; but this would probably fail to protect, as Cherokee cattle are found to be as dangerous as Texans, though largely bred north of this line. The line of safety will probably be found to be that which bounds the ravages of the winter frosts in destroying the vegetation of the previous year. In the north we find that a frost which withers the grass destroys the germs of the poison; and we may presume that the same will hold good for the southern States as well. This will vary much, according to the severity of the winter; and in this is to be found a partial explanation of the greater prevalence of Texas Fever in certain years than in others. Thus, the winter of 1876-7 was less extreme than either of the two preceding ones, and this year we are suffering from a much more extended prevalence of the Texas Fever. This suggests a question as to whether a consultation of the Signal Service reports would not enable us year by year to fix upon a line of demarcation, beyond which it would be unsafe, and should therefore be forbidden, to ship cattle *northward*, and north of which the traffic would be safe, and therefore unrestricted. This is merely advanced as a strong probability, and ought not to be acted upon without misgivings until we know whether, in certain localities, the poison does not exist in the soil at a depth to which a frost which destroys the grass would fail to reach. It is, however, worthy of investigation; and if it is found that it can be safely adopted, the increased facilities thus given to the cattle trade will be of great national value.

"One reservation must be made in the matter of moving cattle during frost. The mere arrival during the last frost of spring will be no protection against the propagation of the disease, as the germs, resident in the bodies of the animals, will be given off for a length of time, and unless they are met by frost when passed from the body they will remain virulent. Hence the laws recently in operation in various States, set the 1st of March as the limit for the introduction of southern cattle in the spring.

"Whether this work of prevention should be the duty of the individual States or of the United States Government, will be matter for difference of opinion. For ourselves, we are fully convinced that it ought to be undertaken by the United States. We recognise the duty of the Central Government in the protection of our ports against the introduction of foreign animal plagues; and a parallel course of reasoning would demand from the same source a general protection from communicable diseases of indigenous origin. No State has a right to make herself the highway for transmitting a plague which will prove deadly to the flocks and herds of her neighbour. Yet two States (Iowa and Missouri), in their protective laws, incorporated a clause whereby it was permitted to carry southern cattle through the States by rail, provided they were not unloaded. Laws of this kind opened the door for the introduction of the disease to the far north, in spite of all the trouble and expense of maintaining a supervision of the cattle trade on the frontiers of the middle States. It even allowed of the possibility of shipping and re-shipping, or, in other words, of "cooking the waybills," so that on their arrival at their destination such cattle would purport to have come from a healthy locality, and would be purchased and mixed with northern stock without apprehension. All of this would be obviated by a uniform system, under a central authority, and carried out with strict impartiality. The supervision would

be on one line only, and the expense would be correspondingly less. Again, if it were established that the line of proscription might be varied from year to year, according to the season, who could draw this line with more perfect impartiality than a central authority at Washington, in connection with the Signal Service Bureau?

"*Southern Cattle for Immediate Slaughter.*

"While the northern States should have an absolute protection against this dangerous southern product, it is utterly unreasonable to interfere with the trade or interests of the south further than is necessary for safety. Store cattle from the south must be absolutely excluded, excepting during the winter, but fat cattle may still be imported for immediate slaughter. It would be otherwise if we were dealing with a contagious disease which spreads its virus in all directions for a certain distance around an infected animal. But the virus of Texas Fever can be fenced in as easily as the animals themselves, and stock on the outer side of the fence will enjoy a happy immunity. To establish a safe traffic in southern fat cattle, therefore, it is only necessary to mark each animal by branding, clipping the tail or otherwise, in a characteristic manner; on starting, to unload them only in special yards, from which all other stock are debarred, and to slaughter them in houses adjoining such yards, within a specified number of days. The cars in which they travel would also require disinfection."

A NEW METHOD FOR THE QUANTITATIVE DETERMINATION OF SUGAR IN BLOOD.

DR. PAVY read a paper some time ago, before the Royal Society, in which he described minutely his new method for the quantitative determination of glucose, and its application to the physiological relations of sugar in the animal system. The accurate results which Dr. Pavy has succeeded in obtaining by means of his new gravimetric process of analysis, and the importance of the subject itself, is such as will tend to advance materially our knowledge, and hence will substantiate and extend the position with regard to the treatment and pathology of Diabetes.

The paper consisted chiefly of a description of the method which the author adopted for accurately ascertaining the amount of sugar in the blood of animals, and formed the prelude to one which was read subsequently in which Dr. Pavy was to give the results obtained by the application of his method as follows:—

1. The natural state of the blood.
2. The comparative state of arterial and venous blood.
3. The spontaneous change ensuing in blood after its removal from the system.

Before describing his own gravimetric system, Dr. Pavy proceeded to criticise Bernard's new volumetric process, which has been described fully in recent issues of the *Comptes Rendus*. This method the author proved to be not only devoid of precision as a quantitative analytical process, but in itself calculated to give rise to fallacious results, inasmuch as keeping the suboxide of copper dissolved by means of organic matter was fundamentally wrong. The entire system was based on errors, and the results were necessarily incorrect; two of these errors the author dealt with somewhat in detail. The first was in the assumption that the volume of trial liquid corresponds in cc. with four-fifths of their weights in grammes of the mixture

of sulphate of soda and blood. In practice it was found that the actual relation between the volume of liquid obtained and the weight of the mixture employed must vary in each individual case, according to the solid matter existing in the particular specimen of blood and the loss of liquid by evaporation during the separation of the coagulum by heat. The other error in Bernard's method arose from the influence which organic matter exerted in preventing the deposition of suboxide. The large addition of potash which is employed in this process—viz., from 20 to 25 cubic centimetres of a concentrated solution to 1 cc. of the copper test—acts upon some one or other of the organic principles left in the liquid obtained from the blood, and prevents the deposition of suboxide of copper.

The author then proceeded to describe his own new gravimetric process, in which he adopts the use of a galvanic battery for effecting the deposition of copper which has been reduced by the sugar in a form to be susceptible of weighing. The details of this method are, shortly, as follows:—

A certain volume of blood—about 20 cc. forms a convenient quantity—is taken for analysis, and first mixed with forty grammes of sulphate of soda; the whole must be subjected to weighing in detail, so that the precise weight of the blood taken may be known. To this mixture, contained in a beaker of about 200 cc. capacity, about 30 cc. of hot concentrated solution of sulphate of soda are added, and the whole contents heated until a coagulum is formed.

Filtration is then performed, and the coagulum thoroughly washed, so that all traces of sugar may be removed. The liquid thus obtained, from having been run and squeezed through muslin, is slightly turbid, and must be boiled again and filtered through paper, to render it perfectly clear. It is now ready for the application of the copper test. Being brought to a state of ebullition, about 10 cc. of the potassic tartrate of copper solution, or sufficient to secure that the test liquid is left in excess, are added, and brisk boiling continued for a minute, but not longer. In this way a reduction of the oxide to the suboxide of copper is effected by the action of the sugar present in the solution.

The liquid is then filtered through a plug of asbestos, or, what is better, glass wool. The suboxide having been collected and washed from excess of the copper test liquid, is next dissolved by a few drops of nitric acid, a small quantity of peroxide of hydrogen having been previously added in order to effect oxidation and consequent ready solution.

The copper present in the liquid is now deposited by the agency of galvanism. The positive pole of the battery is formed by a platinum spiral coil, around which and forming the negative pole is a cylinder of platinum foil; upon this the copper is slowly deposited in a pure metallic form. This operation is continued until the appropriate test shows that the whole of the copper has been thrown down. The period ordinarily required to effect this does not exceed twenty-four hours.

The platinum cylinder is next removed, and instantly plunged first into distilled water, and then into alcohol. After drying in a water oven it is ready for weighing: the difference in the weight of the cylinder before and after the operation gives the amount of copper deposited.

The battery used is a modification of Fuller's mercury bichromate battery and has been selected on account of the constancy of its action.

From the amount of copper deposited, that of the sugar existing in the blood analysed may be accurately calculated. Five atoms of the cupric oxide of the test solution are reduced by one atom of glucose; it follows that 317 parts of copper represent the equivalent of one part of glucose, or the relation stands as one of copper to 0·5678 of glucose. Therefore, to ascertain the amount of sugar, the weight of the copper has to be multiplied by

0·5678. This application of the copper test solution yields a gravimetric instead of a volumetric process of analysis, and one which has no uncertainty belonging to it. There is nothing for the mind to decide, and no opportunity for error of judgment, as may be the case to a slight extent where a gradual fading of colour—as in the volumetric process—has to be watched until the attainment of the proper point of the decoloration has been effected.

The accuracy and reliability of the foregoing process is strongly supported by the uniformity in the results obtained from a large number of experiments. Compared with the results yielded by this gravimetric process, those obtained by Bernard present the greatest discordancy. The figures he gives are invariably too high, and there is no intelligible relation in the differences noticeable—suggesting that there is something radically wrong in taking decoloration without precipitation of suboxide as a means of estimating the amount of sugar. Dr. Pavy supports this assertion by the conclusions derived from a large number of experiments.

LOODIANA DISEASE.

WE are informed by the Principal Veterinary Surgeon in Bengal, that what has been designated Loodiana Disease, had again broken out among the horses of the 9th Lancers and Royal Horse Artillery at Sealkote, seven horses having succumbed when his letter was despatched. In the opinion of Mr. F. F. Collins, the disease is of a purely Anthrax character. "I have found, by the annual reports received from veterinary surgeons, that the nature of the soil at all the stations where the disease shows itself is identical—viz., alluvial, with a clayey subsoil. On soils with 'Kunka' (lime), and soils abounding in salts of soda and potash, also good arable loam, the disease never exists. Alluvial soil is common throughout India, and I am endeavouring to get the flooring of all stables made impervious to moisture. The stables at Morar, where the disease used to be very prevalent, I have had floored with rammed 'Kunka,' and no case has occurred there since,—now two years."

Proceedings of Veterinary Medical Societies, etc.

CENTRAL VETERINARY MEDICAL SOCIETY.

AT a meeting held on Thursday, November 1st, at 10, Red Lion Square, W.C., at seven p.m., the President for the ensuing session, J. Wortley Axe, Esq., in the chair,

Mr. GOWING, SEN., said it would be in the recollection of many present that their late lamented friend, Mr. William Field, jun., had submitted to them a case, illustrated by specimens, showing a morbid condition of the bowels, in detailing which he laid particular stress upon one diagnostic symptom evinced—viz., that one fore-foot was extended and the other brought more under the centre of gravity; also the patient's persistently looking round at his flanks. That symptom was a mere indication of pain: an animal will try to get round and show where the seat of pain is, but cannot till the muscles are put into position to enable him to do so, which cannot be done by both feet naturally placed. This symptom, while indicating abdominal pain, could not guide to a true diagnosis of the case. He was reminded of a

case similar to this, but differing in reference to the seat of disease, occurring in a tradesman's cob, supposed to have Colic. When he saw him there was an anxious look in the eyes, indicative of pain, and the head was turned persistently towards the flanks, the off leg being extended, and the near brought more under the centre of gravity. This position he persisted in. The visible mucous membranes did not present any inflammatory blush, and the action of the heart was not much altered. He was at the time undecided as to the true cause of pain, but did not consider it Colic. There were no tympanitic symptoms, nevertheless he thought it necessary to explore the rectum,—on placing the hand in the off side of which he found a perforation large enough to admit his index finger: then the pain was accounted for. He found, on inquiry, that a person had been in attendance in an early stage, and had used a rather narrow injection pipe for an enema; and to this he ascribed the injury. Here were seen two different causes of disease with similar symptoms. For treatment he cleared the rectum and injected an opium enema, putting the horse on bran diet, with oatmeal and linseed tea, and repeating the enema. The next day the animal was more composed; and the case did well with occasional enemas, the horse being, to his surprise, put to work in ten days, and he lost sight of him for some three years, when he found he was still at work. The chief interest of this case lay in the non-dependence to be placed on the particular symptoms as diagnostic of the organ diseased.

The PRESIDENT thought this case was most forcibly put to show that there were no special symptoms to indicate internal abdominal lesions of the precise organ or part of it involved.

Mr. WRAGG then related a case of Apoplexy, the subject being a cart-gelding six years old, which had been under treatment for three weeks for sore throat with a copious nasal discharge,—which symptoms passed off. His attention was called to him one morning owing to his refusing food. He found him in the stall, standing back from the manger; head down very low; pulse 40, full and strong. On being led out he reeled very much, having little motive power. Being removed to his infirmary, the animal was put in a loose box, and a stimulant given. In the afternoon he fell in the box, but rose again immediately. Hearing him fall again at 6.30, he went in and found him pitched on the head, and the fore-legs doubled under him. He was pulled back into a better position, and found to be comatose, and breathing stertorous; eyes open and fixed; respirations four to the minute; temperature 104⅘; and to all appearance dying. About 8.30 the pulse became very irregular, numbering 80—55—70 beats in five minutes; from which he inferred heart disease also existed. He remained thus, with occasional movements, till about two in the morning, when the pulse reached 120, becoming very feeble; respirations two per minute; and dying very quietly. In the evening stimulants were given by a pump, and chloral hydrate per rectum. On a *post-mortem* examination being made, eight hours after, the heart was found to be unusually large—weighing 16 lbs. Fatty degeneration had evidently taken place; the valves were also diseased; liver much softened and easily broken down. On opening the cranium, about ℥ij. of serum escaped; the brain was soft and of a yellow colour, the vessels large and very distinct. On dissecting the brain, a clot about the size of a bean was found on the choroid plexus, in the left lateral ventricle. He concluded that, the heart being hypertrophied, the blood was sent into the cerebral vessels with increased force, and the vessels, being weaker, became ruptured. In answer to questions, he said the animal lay still, and he had not observed any disease of the bones; the choroid plexus deposit was sanguineous, and not granular.

Mr. MOORE, SEN., had had a case from the head knocking against the

lintel of the door, which was too low for him. This produced violent fits. He thought in all probability the horse had received an injury to the brain. The heart would soon become involved, and produce the symptoms detailed.

The PRESIDENT said it was a very common occurrence in cardiac disease, when there were fibrinous secretions on the valves, for fragments to be set at liberty in the circulation, and plug up the smaller vessels. Under such conditions softening and ultimate rupture would result. He believed this was a chronic case of such a disease, not as a common one, but as common results of valvular disease.

Mr. J. E. JARVIS produced a portion of a skull, with the following history. The subject was a brown carriage-gelding, some sixteen or more years old. When first submitted to him, he found enlargements of the submaxillary gland and the anterior part of the superior maxillary bone, egg-shaped, and raised in the centre, but not pointing. The third and fourth molars were loose; occasionally, on depressing the head, the off nostril emitted a penetrating and disagreeable-smelling discharge, in quantities of about ℥ij.; it was like white of egg, and would sink in water. The appetite was good, mastication indifferent, and general health good; the head was held on one side while eating; pulse and respiration natural; no œdema of legs; the coat had a staring, unthrifty look. Being a favourite, he was put under treatment; and on being cast, the third and fourth teeth were extracted, the fifth and sixth being moderately firm. A hole being made externally into the cavity so formed, daily injections were made of warm water and cupri sulph. and creosote, also carbolic acid diluted.—Tonics, and the diet restricted to steamed oats and mashes, hay and chaff being well scalded. After a fortnight's treatment, as the result would probably be unfavourable, the horse was destroyed. In the skull shown the near side was healthy, the superior turbinated bones were filled with semi-fluid pus, and the fifth and sixth molars had fallen out; the palate bone seemed all eaten away; the parts had discharged very much, and if not closely examined it might have passed for Glanders.

Mr. CLARKE said he had but two or three days since sent a report and a specimen of a similar case to the College for the assistance of the students. The animal had been under his notice three years; the smell of the discharge from the nostrils became unbearable. When shown him by the omnibus men he felt it ought not to work; although, if used, he would give the driver a guarantee that the disease was not Glanders. A few weeks ago it was discharging at the eye, and pointing so much that he had a view to trephine; but making experimentally a crucial incision and piercing it with a gimlet, there passed out a quantity of pus, so he did not pursue it any farther.

The SECRETARY said that, while in Edinburgh, he saw a horse under the care of Professor Williams that was the subject of a diseased tooth. The Professor had adopted a rather forcible means of extraction: he trephined in the zygomatic ridge, and introducing a chisel, punched it out. From this, as in other cases, he expected the best results. Here the breath was exceedingly sweet. At the time it struck him, as it would probably the majority of them, that the remedy must be more powerful than the result would lead them to anticipate, and that the horse would become a quidder.

Mr. CLARKE observed that with the loss of two or three molars such a horse would become a bad quidder, and unable to fill the stomach.

Mr. GOWING, SEN., said teeth diseases were not at all uncommon, particularly in old horses; absorption of the fang frequently gave rise to further disturbance, the teeth became elongated, and there was a loss of attrition. In one particular case with a neighbour's horse, there was softening of the bones, and nasal discharge. The owner imagined it was a case of Glanders, to which he dissented, and the College opinion was to the same effect. He

was afterwards enabled to examine the parts which were destroyed by disease, and had several loose molars in which there was structural change. Tooth extraction was attended with some difficulty, and he had paid a good deal of attention to the matter, and invented certain instruments for the purpose, and in some cases had been successful where, had he not had these instruments at hand, he might have failed; but he regretted they were not suitable to every purpose connected with tooth disease. Those acquainted with the anatomy of the teeth, their depth in their sockets, and the alveolar processes, knew that to turn them out was likely to cause fracture of the jaw. The forceps had a long leverage and screw action, biting securely on the tooth, when manual power would be sufficient to wrench them out: but some it was impossible to extract with an ordinary lever. The process was to tap it underneath and raise it from its bed—when, the crown of it being above the level of the others, it was fractured off, and so reduced in length by his chisel; then with the lateral or upright action the tooth would come out. In one case he removed two very readily, but there was one at the posterior part much elongated on account of losing its attrition (he quidded a great deal, and was much emaciated); here his instrument would not bear upon it, so he decided to punch it out, and casting the animal, adjusted the instrument, percussing with a hammer till he had displaced it. Then came the gist of the operation: his assistant saying it was out, was directed to insert his hand in the mouth and remove it, but failed to find it; the animal, giving a gulp, had swallowed it, and now lay passive and seemingly nearly dead; he was freed from the hobbles and forced to rise; the respiration was very hurried, but he gave a sudden cough and the tooth flew out: the animal recovered, and he obtained some credit for the operation.

The PRESIDENT considered the specimen an instance of Sarcoma, now a common affection, the growths being generally gradual and unnoticed. He believed this was of long standing, and not noticed till the increasing odour made it apparent. These sarcomatous tumours grow rapidly at times, and when only subcutaneous, develop to the extent of several pounds in a few weeks: and, in answer to questions, they generally originated in the bone itself—the periosteum, or lining membrane—so that to account for their appearing only on one side was very difficult. What was known of them pointed to external violence as an exciting cause, and from the peculiar functions of the teeth for grinding, might account for their being sometimes exposed to accidental concussive influence: he had no data for supposing there were hereditary causes.

The SECRETARY might instance another cause, which was suggested by a case brought to the notice of the early Fellows of the Society, in which both lower jaws were affected owing to misplaced teeth, which, instead of being normal in position, sloped a little on one side, and gave the appearance of petrous tumours; he laid them open, and proved that unmasticated grain had forced its way between the molars, making large cavities at their sockets, and forming a lateral osseal tumefaction. It led to starvation.

Votes of thanks being accorded those Fellows who had furnished topics for discussion, Mr. J. H. Hancock, of 26, East India Road, was proposed as a Fellow, and the meeting adjourned. Present, fifteen fellows and five visitors.

JAMES ROWE, JUN., *Hon. Sec.*

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

THE fifty-third quarterly meeting of the Association was held at the Medical Institute, Hope Street, on Friday evening, November 9th, 1877, Mr. George Morgan, Vice-President, in the chair.

There were present—Messrs. Heyes, C. W. Elam, Moore, Hutcheon, W. Leather, Hopkin, Greaves, W. A. Taylor, T. Taylor, Storrar, Storrar, jun., Locke, Whittle, Rothwell, and the Secretary.

Letters and telegrams of apology were received from the President, Messrs. W. A. Cartwright, E. Faulkner, J. Welsby, and Darwell. The minutes of the preceding meeting were read and confirmed. The Treasurer's statement of accounts for the past year was read and approved.

Mr. THOMAS GREAVES, Manchester, read a paper on "Germs: the part they play in the Production of some Diseases; and Disinfectants: the part they play in Preventing and Modifying Disease."

With reference to the action of disinfectants, Mr. T. TAYLOR spoke of the value of chlorine gas in outbreaks of malignant Influenza, which were so prevalent in Manchester about two years ago. Not only had he found it of service when the outbreak at one very large establishment was on the decrease, and, as is usually the case, the attacks were of a milder character, but he had two instances where, immediately after the outbreak, the animals attacked were isolated and the stables disinfected, and no further cases occurred in them.

Mr. REYNOLDS said that through the kindness of Mr. Taylor he had an opportunity of seeing some cases in Manchester, and the disease having appeared in stables under his supervision during the current year, he adopted Mr. Taylor's suggestion of disinfecting with chlorine; but in his hands the practice failed entirely to arrest fresh outbreaks, or mitigate the severity of subsequent attacks.

Mr. HUTCHEON thought the Influenza could not be attributed to the influence of germs in the ordinary acceptation, as the outbreaks were most irregular in their occurrence. It appeared to be due rather to atmospheric influences: on some days there would be a number of fresh cases, followed by days when there would be very few or none.

Mr. STORRAR considered the germ theory was amply illustrated by the outbreak of Rinderpest, and no doubt in most other epizoötic diseases; but it would require much observation, study, and comparison of ideas and results, before we could determine the laws which regulate the development, propagation, and death of disease-producing germs. As to the divergence of result obtained by Mr. Taylor and Mr. Reynolds, he thought such variation was constantly met with, and applied not only to means adopted for the prevention of disease, but also to the use of curative measures.

Mr. LEATHER said he had employed disinfection by chlorine gas in an outbreak of Glanders and Farcy which had occurred in a newly-built stable, but had obtained no beneficial result.

Mr. HOPKIN believed Glanders and Farcy were propagated by germs, as also were many, if not all, blood diseases; but in respect to the recent outbreak of Influenza, he could not think it was due to germs. He had tried the employment of hyposulphite of soda as a preventive to glanderous poison, but up to the present time all his proofs were negative. He hoped to carry out an experiment to prove, positively, that when the system of a healthy horse had been thoroughly saturated with hyposulphite, he would be impervious to Glander poison.

Mr. W. A. TAYLOR suggested that members should be induced to bring before this and kindred associations microscopical preparations of morbid animal products, and advocated that members should record the action and effects of the various drugs used in daily practice. He thought the divergence in result obtained by Mr. Taylor and Mr. Reynolds was to be explained by the circumstance that whilst the air of the stable only was disinfected, the influence operating in the generation of the disease might exist in the circumambient air, which of course would in a short time be carried into the stable.

He had given 6 lb. of soda hyposulphate daily for three weeks in a case of Farcy, which progressed satisfactorily; but he did not on that account look on the drug as a panacea for the disease. Being a fact, it was one unit towards the elucidation of the question.

Mr. C. W. ELAM thought that experiments to prove whether or not the hyposulphite was a preventive of Glanders should be thoroughly tried, but only under the most complete isolation. He believed Glanders and Farcy could be grown as easily as mushrooms by indifference to feeding and overwork, and without positive contact with animals exhibiting the ordinary symptoms of Glanders; for he had no doubt many horses apparently free from the disease were capable of infecting sound young horses whenever the latter were attacked with Catarrh or Influenza.

The discussion among the members continued, and the general opinion expressed was that Glanders did not originate spontaneously, and that most cases arose in stables where the disease had previously existed, and the germs of the disease had been generated.

Mr. MOORE instanced an outbreak of Eczema where a large herd had been attacked four times in the space of fourteen months.

The discussion on Mr. Greaves' paper was adjourned until the next meeting.

The following gentlemen were nominated for membership:—Mr. Augustus B. Wren, Birkenhead; Mr. Darwell, sen., Northwich; Mr. Darwell, jun., Northwich; Mr. Menzies, St. Helens.

Votes of thanks to Mr. Greaves, Mr. Morgan, and the retiring officers of the Association were then passed.

The following officers were elected for the ensuing year:—Mr. T. G. Procter, President; Messrs. Woods, Heyes, and Storrar, Vice-Presidents; Mr. C. W. Elam, Treasurer; Mr. Hutcheon, Secretary.

RICHARD S. REYNOLDS, *Hon. Sec.*

ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

Pathology of Tetanus and Hydrophobia.

THERE was a large attendance at the meeting of this Society on December 11th; Dr. C. West, president, in the chair.

Dr. JOSEPH COATS read a paper on the "Pathology of Tetanus and Hydrophobia," of which the following is an abstract:—The paper first described the lesions met with. In Tetanus the central nervous system shows hyperæmia and certain appearances in the neighbourhood of the bloodvessels. In the cord and medulla oblongata, pons, corpora quadrigemina, and corpus striatum, but chiefly in the two first named, there is a granular material around the vessels, probably an exudation. In the medulla oblongata it is noted that a longitudinal vessel in the posterior parts is particularly affected, and that here, as well as in other parts, there are occasional hæmorrhages. In the convolutions there is an exudation of a yellow fluid outside the smallest vessels, the medium-sized ones (which are those affected in the cord and medulla oblongata) having mostly escaped. In Hydrophobia there is, in the central nervous system, an aggregation of leucocytes around the bloodvessels. In the cord, medulla oblongata, pons, and corpora quadrigemina, it is the medium-sized vessels which are so affected; in the convolutions it is those of small or capillary size. The salivary glands are infiltrated with leucocytes, which have special relations with the bloodvessels. The mucous glands of the larynx are similarly affected, though much less intensely. The kidneys are hyperæmic, with aggregation of white blood-corpuscles within them. The pathology of these two diseases was then discussed, and it was pointed out that

there is a great similarity in the distribution of the lesions in the central nervous system, as well as a certain analogy in the kind of lesion. The special distribution of the lesion was compared to the localisation of the tubercles in tubercular Meningitis, and ascribed to physiological and anatomical peculiarities of the circulation. Attention was also drawn to the fact that in Hydrophobia the lesions are not confined to the central nervous system, while in Tetanus facts are deficient in this regard, but a parenchymatous affection of the liver, kidneys, etc., is asserted by one author. The special localisation of the symptoms, in both diseases, in the tongue, throat, and neck, was associated with the special prevalence of the lesions in the medulla oblongata, and especially in the neighbourhood of the nuclei of the nerves, in the floor of the fourth ventricle, etc.,—it being pointed out that the principal nutrient vessel of the medulla is specially related to these nuclei of grey matter. It was concluded that in Tetanus and Hydrophobia we seem to have two different poisons, each of which, circulating in the blood, attacks the central nervous system. These agents irritate the nervous system, but as they are different in nature, so the kind of irritation they produce is different. There is, however, a remarkable similarity in the localities indicated by them, and these seem to be specially the spinal cord, medulla oblongata, and corpora quadrigemina ; and, to a lesser degree, the cerebral convolutions. The irritation seems to centre in the medulla oblongata, and in a particular region of it—this localisation being probably determined by the anatomical and physiological relations of the nutrient vessels. The high temperature met with in Hydrophobia, and sometimes in Tetanus, was regarded as not inconsistent with these views.

Dr. ALTHAUS said that they were greatly indebted to Dr. Coats for his paper, and for the valuable series of microscopical preparations accompanying it. The symptoms of Tetanus pointed so much to lesion in the medulla oblongata, that it was interesting to hear that Dr. Coats had found lesions there although Dr. Lockhart Clarke had failed to detect them. He inquired whether Dr. Coats had examined the cervical sympathetic ganglia in Hydrophobia, for in that disease many of the symptoms resembled the phenomena produced by section of the sympathetic ; and he believed that some older observers had described changes in the second ganglion. He could not admit that the changes described by Dr. Coats were so characteristic as he seemed to think, for similar changes are met with in certain inflammatory affections—*e.g.*, acute ascending spinal Paralysis ; nor without more clinical evidence could the view be accepted that Tetanus depends on a special poison, whereas in Hydrophobia there can be no doubt as to the existence of a poison. This was proved especially by inoculation experiments, of which he had seen many when a student at Berlin, twenty-five years ago. At that time there was an epizoötic of Rabies in North Germany ; and Professor Hertwig performed many inoculations, which succeeded in about 50 per cent. of the cases, and many which did not succeed on the first did on subsequent and repeated inoculations, just as occurs often in Vaccinia. Tetanus, on the other hand, has never been transmitted from one individual to another. It is true that epidemics of Tetanus have occurred, but in such cases the same cause has affected several individuals—*e.g.*, changes of temperature. On one night after the battle of Magenta as many as eighty cases of Tetanus arose among the wounded. In fact, the difference between Tetanus and Hydrophobia was enormous, and they had but very little in common. Trismus never occurs in Hydrophobia, the clonic intermittent convulsions of which contrasted with the persistent tonic spasm of Tetanus.

Dr. DICKINSON said that, Dr. Coats having kindly shown him his specimens, he could testify to the appearances described in the paper—especially the exudation of leucocytes ; and it seemed to him that the first noticeable

change in the nervous centres of Tetanus and Hydrophobia was a change in the inter-relations of bloodvessel and nerve. This was true of many nervous diseases—such as Chorea, Diabetes, etc. He himself had observed masses of exudation around the bloodvessels in the spinal cord of Tetanus; but he had seen the same thing in many other nervous disorders, so that he doubted whether it were possible by the microscope alone to discriminate between these various affections. The theory of the blood origin of Tetanus was advocated many years ago by Dr. J. A. Wilson, consulting physician to St. George's Hospital; and he (the speaker) had always thought there was much in favour of that view. There could be no doubt that Hydrophobia was produced by inoculation of a virus; and that a blood-poison was the source of Traumatic Tetanus seemed almost as certain, since it was invariably accompanied by an open wound. Added to which was a sort of incubation period in the interval that occurred almost constantly between the infliction of the wound and the development of symptoms. On many grounds, then, it seemed that Tetanus should be regarded primarily as a blood-poison. Lastly, Dr. Dickinson said that the anatomical changes described in these diseases must only be regarded as a step in the series of pathological processes making up the disease.

Dr. GOWERS said that they must feel obliged to Dr. Coats for his preparations and fresh facts, for whatever view might be held as to his conclusions, he had brought forward important additions to our knowledge of these diseases. Especially was this the case with regard to his researches upon the affections of other organs than the nervous centres—*e.g.*, the parotid gland and kidney in Hydrophobia: the latter might be compared with the early affection of the kidney in Scarlet Fever, described by Mr. Klein. Another point of value in Dr. Coats's paper was the identity of the lesion in the nervous centres in the dog and man in Hydrophobia. The observations detailed favoured the view that there are lesions perfectly distinctive of Hydrophobia from Tetanus. Dr. Gowers had now examined the nerve-centres in six cases of Hydrophobia, and in five of these the changes were so considerable and so similar as to appear to him quite characteristic, for he believed that no lesions in other diseases resembled them in both distribution and character. In each of the five cases there was, in the medulla oblongata, not only a dense massing of leucocytes around the bloodvessels, but an infiltration of the tissues with them, forming in places groups of such a closely-packed character as to warrant the term "miliary abscess" being applied to them. In fact, it seemed as if the process had only to advance a step further in order for the medulla to be riddled with foci of suppuration. The changes were far less extensive in the spinal cord. Unlike Dr. Coats, he had found the exudation of leucocytes to occur also around very small vessels—sometimes capillaries,—where they were not so readily recognised, because such small vessels are not limited by perivascular sheaths, and the cells, therefore, escape into the adjacent tissue. In the cases of Tetanus that he had examined, he had found changes similar to that described by Dr. Coats; but the changes were certainly not more intense in the medulla than in the cord; he rather thought they predominated in the latter. But, regarding the nature of the changes in Tetanus, which Dr. Coats had pointed out were different from those of Hydrophobia, the effect of severe congestion must be taken into account. Such congestion of all the organs of the body, from paroxysms interfering with respiration, would be more intense in Tetanus than in Hydrophobia; and it was probably for this reason that the extravasations of blood were more marked in Tetanus, and might assist in producing the accumulations of granular matter observed around the bloodvessels in that disease. Moreover, the effects of mechanical congestion would be greater on organs which were already in a condition of increased functional

activity, and therefore fully supplied with blood. As to the limitation of the granular material to the vicinity of the vessels, it must be borne in mind that the spaces around the vessels were the only spaces where granular material could aggregate; and this localisation of the granular material could hardly, therefore, be taken as evidence that the cause of Tetanus acted through the vessels. In fine, Dr. Gowers could not help thinking that the lesions of the nerve-centres in the two diseases were in harmony with the current theories of their nature. Thus in Tetanus it was generally held that the symptoms were due to the effect produced on the central nervous system by an irritated or inflamed nerve. In many cases an ascending inflammation had been traced in the nerve, and this was believed to excite the disease, although it was quite possible that some poison, such as that produced by changes in temperature, and analogous to the Rheumatic poison, might predispose a subject to the development of Tetanus, or even, acting alone, might induce the disease (as in Idiopathic or Rheumatic Tetanus). Hydrophobia, on the other hand, was regarded as the result of a special poison which, circulating in the blood, passed from the vessels, irritated the nerve-centres, and produced the profound vascular lesions met with. In Tetanus, the comparatively slighter vascular lesions were more in harmony with stimulation by a peripheral irritation, than with the notion of a poison circulating in the blood.

Dr. T. C. TURNER remarked that aggregations of leucocytes, even to the extent of the "miliary abscess," might be produced in a very short time, even after death. For instance, he had found on examination of the stomach, in three cases of sudden death, in subjects otherwise healthy, a large collection of leucocytes between and around the gastric glands. Such a change was no doubt due to congestion, sufficient to alter the vessel-wall and allow of the exudation of leucocytes. In one of the cases—a healthy child, fourteen years of age, killed by injury to the head—there was also a small hæmorrhagic infarction in one lung, which he presumed was probably produced in the same way. On examining the nervous centres, kidney, and liver, from a case of Hydrophobia, he had found in all these parts an appearance of exudation of leucocytes around all the vessels, and in some parts also infiltrating the tissues. The appearance was most marked in the grey matter of the cord, and he noticed that in the dorsal region the white matter was softened. In the cervical part there had been distinct hæmorrhages from one or two of the larger vessels; and a good deal of granular matter—probably the result of hæmorrhage—also existed. There was nothing particular in the brain; but in the kidneys, between the tubules, and in the liver, especially in the portal canals, there was a great increase in leucocytes, with clear matter between them. In another case he had found, in addition to the leucocytic infiltration in the spinal cord, a varying amount of exudation material in more or less defined masses—similar, in fact, to that recently described by Sir W. Gull and Dr. Sutton.

Sir JOSEPH FAYRER said that he had been profoundly interested and instructed by what he had heard, but at the same time much disappointed. It was true that he had heard much he had not heard before, but he had hoped also to have heard something about the diseases themselves,—as to their phenomena, and what could be done to cure them. At present they were almost incurable; one of them, at least, was quite incurable. He had seen much of Tetanus in the East, where it prevailed to a great extent endemically; but he would not trespass on the time of the Society in detailing his experience. He would only say that, in his opinion, Idiopathic Tetanus was very amenable to treatment, and possibly Traumatic Tetanus also; and he hoped that subsequent speakers, more able than himself, would enlighten them as to the nature and treatment of the disease.

Dr. BUZZARD, referring to Dr. Coats's observation that special arteries of

the nervous centres were most affected, said that this selective property of the hydrophobic poison was not more difficult to explain than the affinity of certain mineral poisons for particular tissues or organs. Thus arsenic, no matter in what way it was administered, acted especially on the skin and alimentary canal, mercury on the salivary glands, lead on the muscular structures and on peripheral nerves, and especially in particular regions of these. All this reminded them of Virchow's doctrine of special affinities; and the question arose whether such might not possibly be due to some chemical constitution of the affected regions by virtue of which these parts more than others attracted from the blood substances for which they had an affinity. On this ground, and also in view of the fact pointed out by Dr. Althaus that the anatomical appearances were not peculiar to Hydrophobia, he would ask whether all that could be gained from microscopical examination had not been attained, and whether it was not now time for the chemical analyst to step in and explain facts beyond the power of the microscope to fathom?

The usual hour for adjournment having now arrived, the PRESIDENT, remarking upon the importance of the subject, suggested that it might be worth while to adjourn the discussion to the next meeting, when they might have the advantage of hearing the views of Sir Joseph Fayrer and Mr. Curling (who had risen to speak) more at length.

Mr. CURLING suggested that the meeting might be prolonged for another half-hour, to allow of the discussion being completed. This course being agreed to, he proceeded to say that he had listened with much interest to Dr. Coats's paper upon the appearances found in these diseases. There was one point which always struck him in considering the changes described in Tetanus—changes upon which Drs. L. Clarke and Dickinson were in agreement. It was, that the clinical history of these cases did not bear out the changes found; for these latter involved so much organic change in the nerve-centres as would, it might be supposed, have produced paralysis. But he had never seen a single case of Tetanus in which paralysis occurred, even towards the close of life. He could hardly agree with Dr. Coats that the most frequent cause of death in Tetanus was syncope. As a rule, the patients died from arrest of respiration through spasm of the glottis. The period of incubation was very different in the two diseases. In Tetanus it was about from ten to fourteen days. In Hydrophobia it varied from six weeks to as many months or even years; and it was an interesting question as to what had become of the virus during all the time that elapsed from the infliction of the wound to the development of symptoms. He was inclined to agree with Dr. Althaus as to the distinction between Tetanus and Hydrophobia. There was no doubt the latter was a blood disease; but it did not seem that the view of Tetanus being a blood disorder was borne out by treatment, for in Tetanus, if the case were taken early enough, and the nerve proceeding from the wound were divided, the disease might be arrested. Of course, the wound might be so situated that it was impossible to do this, or at any rate without the sacrifice of a limb; but there were many cases in which it might be done with safety, often with the best results.

The PRESIDENT hoped that Sir Joseph Fayrer would favour them with some other remarks.

Sir JOSEPH FAYRER said he did not wish to enter into the whole subject; he might say, however, that he could fully confirm Mr. Curling's statement as to the manner in which by section of the nerve proceeding from the wound Tetanus might be arrested. He instanced a case dependent on a wound in the palm, in which the symptoms were well marked, where division of the median nerve at the bend of the elbow was perfectly successful.

Mr. HOWSE was interested in finding that Dr. Coats believed Tetanus to be due to a poison, for from a clinical point of view he had arrived at the

same conclusion. For the last seven years he had rigidly carried out in his wards Mr. Lister's antiseptic principles, and in spite of that he had had about five cases of Tetanus during this time. In all the wounds were remarkably similar—generally occurring when the patient had been dragged along the streets, and had dirt ground into the tissues to such a depth that it could not be removed; and such cases presented other symptoms more obviously due to blood-poisoning, so that he believed that Tetanus was dependent on a blood-poison analogous to septic matter. One case was that of a lad who fell into a midden heap, and sustained a compound fracture of the leg, and the wound was filled with dirt, and was altogether in a most filthy state. An attempt was made to save the limb, but tetanic symptoms set in. Mr. Howse amputated through the knee-joint; and although the Tetanus subsided, the boy died from Pyæmia. Another case was that of a man who was dragged along for a hundred yards by a train, and received a large lacerated wound involving the deltoid, with much dirt scraped deeply into it. Here in four or five days Erysipelatoid Inflammation set in, and two or three days later well-marked Tetanus. In fact, those cases were most prone to Tetanus where foul material, such as London mud, was deeply ground into the tissues; and this, he thought, was strong evidence as to Tetanus being due to a local poison. He was aware that Idiopathic Tetanus was instanced as an argument against this view, but he could not help thinking it to be perfectly distinct from Traumatic Tetanus; for, of two cases of the idiopathic affection he had been called to see, one was cured by iodide of potassium, and the other by the green iodide of mercury. Whilst, as to cases of the traumatic variety, which had been cured by section of nerves, it might well be that the connective tissue of the nerve itself or its bloodvessels was the medium for the transference of the poison in such cases.

Dr. FITZPATRICK remarked that Tetanus was not uncommon among horses, and many veterinary surgeons had successfully treated it by conia. He himself lost a horse from this disease last year. It died from spasm of the respiratory muscles.

Dr. GREENFIELD said that it was important to distinguish between facts of pathological anatomy and the pathology of a disease. The changes described by Dr. Coats had to a certain extent been recorded by other observers, but those observed in the cerebral convolutions were new. He must, however, venture to protest against our views of pathology being solely grounded upon what is seen with the eye; and he did not think that as yet the changes in the nervous centres in Hydrophobia and Tetanus—changes which, so far as his own observation went, were extremely variable—afforded any proof that they were any other than the results of irritation. Similar changes had been found in Chorea and Scarlet Fever; and it was open to question how far some of them might not be the result of the same conditions—*e.g.*, high temperature, common to some cases of these affections—rather than essential to and characteristic of one disease in particular. Hence too much stress should not be laid upon their occurrence as explanatory of the true pathology of these diseases.

Dr. JOHN HARLEY mentioned that in his experiments on the action of aconite upon the dog, he had been able to produce all the symptoms of Hydrophobia, and had attributed them to extensive hyperæmia of the spinal cord.

Mr. JOHN WOOD, seeing that Dr. Coats had extended his observations upon the changes in Hydrophobia to other organs than those of the nervous system, would like to ask whether he had examined the scar of the bite in such cases. Such examination might throw light upon the incubation of the disease, for, if anywhere, the virus was most likely to be met with in the cicatrix.

The PRESIDENT, in closing the discussion, called the attention of the Society, and especially of surgeons, to a large field of observation yet unexplored—namely, the Tetanus of new-born children, so prevalent in some lying-in hospitals, as the Foundling at Paris. It was very prevalent at Dublin when he studied there, many years ago, but had been practically banished by improved ventilation. Such cases presented all the features characteristic of Tetanus in the adult, and their study might throw much light upon the nature and causation of the disease. He had only met with one case since that time, and that was in an infant born under most favourable surroundings. There was one other remark which he ventured to make, although with diffidence. Since he had had the honour of presiding over that Society, he had been much struck with the growing tendency to ignore the results of clinical observation, and to look too narrowly into the changes observed in organs by the microscope after death. He could not forget that in Sydenham's day morbid anatomy was almost unknown, and yet the knowledge of disease was great, for it was derived from the careful study of the phenomena presented in the course of the disease; and he feared that the tendency nowadays was to lay too much stress upon what one appeared to see with the eye, and so to study the one as not to see the other and more important aspect; for surely more was to be gained in the treatment of disease from studying it when in progress, than when its results were completed and it was beyond interference. Nor did he find that these advances in the direction of *post-mortem* observation had done very much to put a stop to wild theories—theories as extravagant as those which prevailed a century or more ago. Then humoral pathology prevailed, and men talked of "fermentation of the blood," and the like; but now precisely the same class of explanations were started, with this exception—that in those days such explanations did not affect to be clothed in the garb of scientific knowledge. It seemed to him that there was a risk, in the presence of all the increase of improved scientific instruments, that we might be led away from the essential features of disease, and the progress of medicine be retarded. In searching for the causes of disease in this one-sided manner, we were too apt to lose sight of our special function as the curers of disease.

Dr. COATS, in reply, said that some misapprehensions which had arisen were doubtless due to the fact that the paper had only been read in part. He by no means asserted that the lesions described were the essence of either disease, but were only the evidence of irritation—probably a poison acting on the bloodvessels; and as these evidences differed, so he inferred the causes of irritation differed. He recognised an absolute difference between the two diseases, holding only that both might be due to the action of some morbid poison. He thought the term "miliary abscess," applied by Dr. Gowers to large collections of leucocytes, not a happy one, for an abscess implied pus, and pus was a fluid; whereas in many conditions (*e.g.*, cirrhosis of the liver), there was abundant infiltration of leucocytes, but not the formation of pus. The collection of small cells, like leucocytes, in the gastric mucous membrane, was only an exaggeration of the normal lymphatic tissue of that organ.

Dr. TURNER said that the infiltration he referred to was of large collections of cells, which were much larger than the normal lymphatic tissue.

Dr. COATS said there was no destruction of nervous tissue, and therefore he would not expect to have any paralytic symptoms. Referring to the incubation of Hydrophobia, he said it was not more wonderful than what occurred in acute miliary Tuberculosis, from the infection of a caseous focus which might have persisted for an indefinite period. He had examined the cicatrix in Hydrophobia, and in one case found evidences of irritation, although a long time had elapsed since the wound had been inflicted;

but he had found no specific material in the scar. Lastly, he said that he had only approached the subject from the side of morbid anatomy and physiology.

The Society then adjourned.

MONTREAL VETERINARY MEDICAL ASSOCIATION.

THE usual fortnightly meeting of this Association was held on October 25th, at the Veterinary College, Prof. Wm. Osler in the chair.

The following new members were balloted for and elected:—Noah Cressy, M.D., Amherst, Mass.; P. Cummings, Quebec: Matthias Smith Brown, Montreal; Wm. Jackeman, Boston, Mass.; Mr. Harris, Ottawa; Mr. White, Montreal; Geo. H. Parkinson, Bridgeport, Conn.; H. J. McMartin, Montreal.

Mr. C. C. LYFORD, V.S., Roscoe, Ill., read a very interesting paper on "Inflammation of the Lymphatics," illustrating his remarks by cases, which led to an animated discussion on the causes and true pathology of these cases.

Professor CRESSY objected to the name made use of by veterinarians to indicate this disease. He was of opinion that the inflammation of the lymphatics was merely a consequence of some other pathological condition.

The CHAIRMAN ageed with Dr. Cressy that there was room for improvement in veterinary nomenclature.

The PRESIDENT agreed with the two gentlemen as to the defective state of our nomenclature, but thought "Lymphatitis" was as good a name as any other, for although the disease was a consequence of errors in diet, and probably mal-assimilation, the lymphatic glands being the principal seat of the inflammatory action, it could be as readily recognised under the old name as under any new or more technical one.

Dr. F. W. MCLELLAN, of Bridgeport, Conn., next read an instructive case of "Rupture of the Cæcum," in which he minutely described the history of the case. The horse had been losing condition for some time previous, and the owner administered a large dose of oil of turpentine in milk, which set up inflammation of the diseased portion of the intestine, and ended in the final perforation of the bowel and the escape of the contents, setting up Peritonitis. The *post-mortem* examination, which was conducted by Prof. Osler, revealed the fact that an ulcerated condition of the cæcum near its blind end had existed for some time, and that during the recent enteric attack set up by the turpentine, the attenuated coats of the bowel gave way. The specimen was exhibited and carefully examined by all present. An animated discussion followed on the causes and symptoms of these cases.

The next fortnightly meeting was held in the lecture-room of the College, Union Avenue, on November 8th. After the usual routine of business, the PRESIDENT referred to the large and handsome addition that had been recently made to the library,—some sixty volumes, comprising many of the standard works on anatomy, physiology, pathology, surgery, etc. Votes of thanks were then tendered to the President, Professor Osler, and Mr. C. J. Alloway, for their valuable contributions of books. Mr. J. A. COUTURE was then called upon to read his communication of a case of extensive sloughing of the skin and muscles of a horse's thigh, which was followed by an animated discussion. The event of the evening was the reading of a paper on "The so-called Hog Cholera, or Typhoid Fever in Pigs," by Professor WM. OSLER, Vice-President of the Association. The lecturer in the course of his remarks dwelt upon the great importance of the subject under discussion to the agriculturist, as stock raisers in the United States alone suffered a loss of $20,000,000 annually, principally in

Ohio and Illinois; neither was the disease unknown in this country, as during the past season a well-known agriculturist near Quebec had had his herds decimated by its ravages. The doctor also spoke of a number of experiments conducted by him at the Veterinary College here, in which the disease was produced in five subjects from different methods of inoculation, and minutely described the symptoms and *post-mortem* lesions in each. He showed the infectious nature of the disease, and urged the importance of strict enforcement of sanitary laws. Professor Osler intimated, however, that the paper was only preliminary; he had made extensive examinations of all the cases, and of a large number of *post-mortem* examinations made at Quebec specimens were preserved in the College museum, and drawings of the *post-mortem* appearances were being prepared (a beautiful specimen of which was exhibited); and it was intended that an extensive paper on the subject should shortly be presented to the profession. The PRESIDENT remarked that this disease was discovered in two pigs lately imported, and fortunately detained in the quarantine. Professor CUESAY also gave his experience in this direction, which, being somewhat extensive, was listened to with considerable interest.

Obituary.

WE have received intelligence of the death of an old and esteemed member of the profession, William Cockburn, of Glasgow. Mr. Cockburn graduated so long ago as 1835, and was for several years a member of the Examining Board of the Royal College of Veterinary Surgeons. He was universally respected, and had a large and lucrative practice in Glasgow. At his death he was seventy-four years of age.

Army Veterinary Department.

Gazette, November 23.

ROYAL ARTILLERY, Veterinary-Surg. B. A. W. Powell, from the Veterinary Department, to be Veterinary-Surg., vice J. E. Elphick, who exchanges.

VETERINARY DEPARTMENT.—Veterinary-Surg. J. E. Elphick, from the Royal Artillery, to be Veterinary-Surg., vice B. A. W. Powell, who exchanges.

Gazette, November 29.

YEOMANRY CAVALRY, SHROPSHIRE.—H. Barnes, Gent., to be Veterinary-Surg.

Gazette, December 7.

ROYAL ARTILLERY.—The under-mentioned Veterinary-Surgs. on probation to be Veterinary-Surgs.:—Daniel Chambers Pallin, vice E. T. Cheeseman, transferred to the 5th Dragoon Guards; Joshua Arthur Nunn, vice J. Tatam, promoted Staff Veterinary Surgeon.

In India, Veterinary-Surg. S. R. Sartin, Royal Artillery, has leave from October 8, 1877, to April 7, 1878, on recommendation of a medical board.

Veterinary-Surg. J. P. Adams, to proceed from Mooltan to Allahabad, to take over veterinary charge of horses of E Battery, 4th Brigade, Royal Artillery.

The following movements of Veterinary-Surgs. of 5th Brigade, under orders to proceed to England, are ordered :—

Veterinary-Surg. B. L. Glover, 5th Brigade, to join E battery on its arrival at Lucknow.

Veterinary-Surg. C. Phillips, 5th Brigade, to proceed from Barrackpore to Allahabad.

Notes and News.

THE DIAGNOSIS OF PREGNANCY.—According to a correspondent of the *Milch Zeitung*, says the *Farmer*, the following is a trustworthy and simple means of determining whether a cow is in calf. Some of its fresh-drawn milk should be allowed to fall, drop by drop, into a glass containing clear spring-water. If the drops spread out and get mixed with the water, the cow is not pregnant; if, on the other hand, they quickly sink whole to the bottom, she may safely be declared in calf. In the case of young cows, whose first pregnancy is in question, a little of the fluid in the udder should be milked upon the palm of the hand. If the fluid be tenacious, viscid, and gummy, it is a sign of pregnancy, and the greater its tenacity the further has pregnancy advanced: if, however, it be thin and watery, the animal is not in calf. The writer does not pretend to offer any explanation of why these things should be; he simply avers that they are facts, which have never played him false in a lengthened experience, and invites his brother dairymen to test them for themselves.

PROGRESSIVE ACHROID IN THE HORSE.—A well-marked instance of those curious abnormal changes of colour in the horse's coat which occasionally come under notice, is recorded by Herr Albrecht in a recent number of the *Wochenschrift für Thierheilkunde und Viehzucht*. Up to the end of his fourth year the horse in question had been an ordinary brown. At the beginning of the fifth year, round or oval white patches about six centimetres in diameter appeared, first upon the head, and then on the throat and neck. At the age of four and a half years, they extended to the back, ribs, and hind-quarters, and soon spread to the belly and the legs. By this time the brown horse had become a piebald. Between the fifth and sixth years, the white patches gradually spread and blended into each other, till ultimately every trace of brown had disappeared, the horse being grey all over, except as to its mane and tail, which remained black, as before. The change of colour in this case appears to have been accompanied by considerable constitutional disturbance. So long as it proceeded the horse was subject to frequent colds, lost all appetite and spirit, and got into very poor condition; but directly the new order of things was finally established, all these adverse symptoms disappeared, and the animal recovered his original character as a hard-working, good conditioned, and high-spirited beast.

THE TURKISH ARMY.—From an instructive article in the *Times* on the Ottoman army we extract the following notes, which may be of interest to veterinary surgeons. We are not informed as to the constitution of the veterinary department of that army, but it appears that each regiment of artillery—which consists of four battalions—is commanded by a liva-pasha, or general of brigade, with a colonel and lieutenant-colonel on his staff, to which is attached a first-class veterinary surgeon and thirteen other sub-officers. The command of an artillery battalion is entrusted to a *chef de bataillon*, or bin-bashi, with two adjutants-major, three medical officers, a veterinary surgeon, and three sub-officers as a staff. "Our correspondent

in Armenia was much struck with the battery mules in Armenia—strong, fine animals, many fourteen hands. They mostly come from Persia, and command a long price; indeed, a man asked our correspondent £35 for a really good animal, and not only refused to take less, but rode away when he offered it." Artillery horses are mostly imported from Hungary, and are, though small, powerful, hardy animals. They are allowed 12 lb. of barley and 16 lb. of grass per diem; in the month of May they are turned out to graze for fifteen days, when they receive only half rations of grain. With regard to cavalry, we are informed that in a *corps d'armée* it consists of two brigades, each of which is composed of two regiments. The regiment has six squadrons, and the effective strength of the squadron is 155 men and 165 horses. The staff of a regiment comprises one colonel, one lieutenant-colonel, two *chefs d'escadron*, two adjutants-major, two paymasters, nine medical officers of various grades, three veterinary surgeons, an armourer, a farrier, and a saddle-maker. The horses generally are country bred, and their rations consist of 9 lb. of barley and 12 lb. of grass. Occasionally, more especially in the 1st and 2nd army corps, Hungarian horses are found. They receive the amount stated as the ration for artillery horses. "All animals, country-bred as well as those imported, are turned out to grass for fifteen days in the month of May. The manner of shoeing is different from what we practise. A circular plate of iron, with a small round hole the size of a shilling in the centre, is fastened on with seven nails. This certainly protects the frog; and our correspondent with the Turkish army found himself compelled to adopt it after a very short acquaintance with Armenian roads, although his horse had up to that time in European Turkey worn only the ordinary English shoe."

"BLAZES."—Nowadays, the horsy philosopher allows that "there are good horses of all colours and with all sorts of marks." It was not always so; there was for a long while a great prejudice against horses with "blazes,"—which term, though properly only applicable to a peculiar streak of white on the face from the forehead to the nostrils, may for convenience be extended so as to include "white stockings" and "silver legs," the former expression being self-explanatory, and the latter referring to the rare case of a horse having one of its legs peppered as it were with white hairs. It is, of course, easy to say that the good horses with "blazes" are only the exceptions which prove the rule; but when the exceptions are so very numerous as they might be shown to be (including "Eclipse," "Stockwell," and "Blair Athol," moreover), the rule appears to be in jeopardy. On the other hand, it is very justly observed by an authority that "we should never be in a hurry to reject the warnings of ancient tradition; as it is the fruit of successive observations during several generations, it is nearly always based upon the experience of facts;" and there is even still a general inclination to speak and think disparagingly of a horse with a *great deal* of white. The least objectionable form in which a "blaze" can appear seems to be that of a streak or star upon the face; it certainly, even then, is rather unpleasantly suggestive of baldness; but, if it do not indicate any deficiency more serious than weakness of mind, that cannot be considered any great drawback in the case of an animal whose mouth must be held with bit and bridle, and whose back is very frequently bestridden by one who is no Solomon, and who wears a cap indeed, but not the famous cap of consideration. As for "blazes," properly so called, "Stockwell" and "Blair Athol" have already been mentioned; and they are a host in themselves. It may be added that chestnuts are the most liable to "blazes," and no doubt for that very reason have always been considered to bear them with more impunity than horses of any other colour. Was not "La Toucques," a good chestnut mare, winner of the French Derby and very

nearly of the Grand Prix, all over "blazes"? One would be sorry, relying upon memory alone, to do her injustice; but her name seems to evoke a spotted spectre as of a performer at Astley's, or of that piebald-painted animal not long ago bestridden by the headless horseman in Leicester Square. As regards "blazes" on the legs, the French have a proverb running "Cheval de trois, cheval de roi." Unfortunately the meaning, as not uncommonly happens with proverbs, is variously interpreted. It is admitted by general consent not to apply to what we call a horse with three legs, but to a horse with three white stockings; and there is a dispute as to whether it means a mere showy cocktail, such as a Sultan might ride on parade or in procession, or a horse of grand quality, fit for a king. In the latter case it might apply to the half-legendary "Eclipse," whose portraits seem to represent him sometimes with two white stockings and sometimes with four, so that, taking the usual course of splitting the difference, we should assign him three. As regards the real or supposed evils accompanying white stockings, they are by no means confined to looks and the fancies of fashion. The white stockings may be high or low, on the fore-legs or the hind-legs, on one fore-leg and one hind-leg, whether on the same side or diagonally; and there may be only one white stocking. Under any circumstances, the hoof, or that part of it, if any, which is white, to correspond with the white hairs, is declared to be more brittle and at the same time less hard than the black hoof. It is asserted, on the authority of thirty years' observation, that white stockings on the hind-legs are less important than on the fore-legs—lameness in the latter case being far more likely to ensue. At the same time it is better that there should be a white stocking on each, if on either, hind-leg, otherwise the leg with the single white stocking will probably show symptoms of "filling" before long. Whether the disadvantages are balanced and rendered null in the case of what the French call a *trans-travat*, or horse with diagonal white stockings fore and aft, and whether they are doubled in the case of a *travat*, or horse with two white stockings on the same side fore and aft, is a question which may be left for the public in general, and stablemen in particular; but what appears to have been clearly ascertained is, that bay horses with white stockings on the fore-legs are especially likely to suffer. If it were boldly stated that three white stockings, one in front, and two behind, indicated a peculiar aptitude for steeplechasing, *risum teneatis, amici!* Yet it is difficult to account in any other way for the singular change that came over "Astrolabe," the chestnut daughter of "Allez-y-Gaiment" and "Aganisia," in 1865. To her, being a chestnut, "blazes" and white stockings signified nothing if not steeplechasing, but she was, in defiance of her destiny, put to the selling-plater business on the flat, and made a sorry exhibition; but, being sold to M. Finot, she was schooled during the winter of 1864, and is said to have won as many as twelve steeplechases in 1865. She was running, at something under twenty years of age, last year; but it cannot be said that her success, at any rate in this country, was commensurate with her evident aptitude and her promise in 1865.

HÆMATURIA IN CATTLE.—Herr. Fr. Stouki, a veterinary surgeon resident in Finland, where Hæmaturia in cattle is specially prevalent—owing, as he thinks, to the practice of pasturing them in woods and on marshy ground—forwards to a German contemporary some notes of the line of treatment he has found exceptionally successful, in the hope that their publication may be of use to stockholders elsewhere. His practice has been to have the affected beasts at once housed in their sheds and fed upon nothing but hay. Slightly-soured milk is given as drink in the place of water, and a full action of the bowels ensured by administration of Glauber's salts. In addition to this

general treatment he gives a teaspoonful of sulphur balsam spread on a bit of bread every four hours, or in cases where the animals refuse the bread he gives it in a liquid form, diluted with twenty times its bulk of water. In all his experience he never had a patient under treatment more than four days, although in some instances the urine was already of a dark-red colour, and the cows had ceased either to eat or to chew the cud when they came under his care. Of forty cases recently under treatment he lost but one, and that was an ox suffering from concurrent constipation, which could not be overcome by either purgatives or enemata.

CATTLE PLAGUE.—The present cruel Russo-Turkish war has, as on former occasions, caused a wide diffusion of Cattle Plague, not only in the countries immediately occupied by the Russian armies, but in adjoining, and even somewhat remote, countries. In addition to the other horrors of war, this plague is the inevitable accompaniment of a Russian invasion. A contemporary states that Cattle Plague is extending at a serious and alarming rate in Transylvania, and that the Hungarian Minister of Commerce has sent a special commission to Paresova to inquire into the matter.

RABIES IN CORNWALL.—In the northern districts of Cornwa there are several mad dogs at large, and hundreds of sheep have been destroyed. The alarm of the inhabitants is so great that the police force is to be immediately increased, and each individual in it to be armed with a carbine. All dogs straying or suspected, or without muzzles, are to be at once shot.

TRICHINOSIS IN GERMANY.—Trichinosis has become excessively prevalent recently at Leipsic. All classes of the community, even the aristocracy, have been attacked by it; and at Stettin alone there were forty-one cases in one week.

THE SOLUBILITY OF SALICYLIC ACID.—Salicylic acid, the antiseptic properties of which are now so much vaunted, is very sparely soluble in cold water,—only one part to three hundred; while the undiluted acid or an alcoholic solution are not suitable for wounded or abraded surfaces. Dr. Bose has discovered that the solubility of the substance is greatly increased by the addition of borax: ten parts can be dissolved in one hundred parts of water if eight parts of borax have been previously added to the fluid. The borax is first dissolved by the aid of heat to the boiling point, and then the acid is put into the mixture. The most suitable strength in which this solution is recommended to be used for wounds is one which contains from 2½ to 5 per cent. of salicylic acid, and 2 to 4 per cent. of borax.

Correspondence, etc.

SPURIOUS TITLES.

To the Editor of the VETERINARY JOURNAL.

DEAR SIR,—As a graduate of an Edinburgh College, and using the affixes "E." and "L.," which seem to cause your correspondent "Rebus" so much annoyance, I am desirous of soothing his irritation, and, if possible, preventing the ulterior consequences of such a condition, by informing him why *I* do so.

And to put the matter straight and plain, I say at once, because I consider that there is as good a *legal* right to the one as the other. Whether there be any such distinction as M.R.C.V.S.L. or M.R.C.V.S.E., it is an undoubted fact that the great majority of the graduates at the Royal Veterinary College

in Camden Town, or the students who have studied there, adopt the former affix, with the evident intention of letting the public know that they studied there. And I have little doubt but that they consider there is great virtue in hailing from such an arcanum of science—at least, a great many of them believe that nothing good can possibly come from anywhere else. Now, if it be necessary to let the public know that they are graduates of the London School, by affixing the letter "*L*," it is only honest on the part of the Edinburgh graduates to affix the "*E*," so that the public may avoid inferior talent, when such is the opinion entertained of them.

But apart from the narrow notions held by graduates of veterinary science, the distinctions of "E" and "L" are affixed to the fellows or members of the Royal Societies of London and Edinburgh respectively. And even in the matter of the medical corporations of the three kingdoms, the initial letters of the countries are used to distinguish graduates. What more common than M.D. of London, or M.D. of Edinburgh, and even M.D. of Glasgow, St. Andrews, and Aberdeen?

If any one has passed the examinations of two regularly constituted boards—said boards having their head-quarters in two different countries—surely he is entitled, *cæteris paribus*, to use the initial letters of the capitals of the kingdom which the board claims as its home.

Now, it so happens that a Charter—or instrument granted by the Sovereign, with the advice of his or her Privy Councillors—is the source of power in both cases under consideration; and if priority of constitution is of any consequence or concern, the one is about half a century older than the other. The Highland Society was established by Royal Charter in 1787, while the Royal College of Veterinary Surgeons was incorporated in 1844.

It is clear that the Highland and Agricultural Society has the power of appointing a board of examiners, and conferring a certificate or diploma of competence to practise the veterinary art; or they could not have continued to do so to such an extent,—for they have granted upwards of 1000 diplomas. And not only are they empowered to do so, but they are enabled by the same means to grant certificates and diplomas in Agriculture and Forestry—thus completing the cycle of the sciences in connection with the most ancient and most useful arts for which our country is famous.

It is maintained by some, however, that the one is only a certificate, and the other a diploma. The difference is more apparent than real,—indeed, is purely conventional, and arises out of custom, fashion, or tacit agreement. A diploma is just a certificate, and nothing more—a writing conferring some privilege,—and is often given to agents who are authorised to transact business for their principals. The term diploma is given to a certificate, because it was formerly written on waxed notes and doubled together (from the Greek adjective διπλόος, double), so that none of the certificates really answer the conditions, and are consequently on a par in this respect.

Now, the value of a certificate or diploma is estimated by the eminence or status of those certifying; and if we contrast the one with the other, we shall find that the certificates or diplomas of the Highland and Agricultural Society contain names of men as eminent in their respective departments as any that ever graced those of the Royal College of Veterinary Surgeons.

Nor is there any use cavilling about the letters M.R.C.V.S. and merely V.S., for they both imply the same thing—viz., veterinary surgeon,—and are so regarded and received by the public; and we have lately been made aware that we are not entitled to the exclusive use of any of them: at least, we are unable to challenge the right of any one who may choose to adopt them. When such is the case, and when they are pretty much on a par as to the qualifications of the examiners, what is the use or object of all this chirping about royalty, and these envious sneers at an Edinburgh graduate if he

should affix the letter E to his name? So far as the right to do so is concerned—and which is the question "Rebus" puts—they are on a par, for it is only a Royal Charter in both cases, with this difference, that one exists by the sale of its certificate and has no other means of subsistence, while the other is supported by other means, and gives its certificate to all who are declared worthy.

From personal experience I can state that the examination of the Highland Society's diploma, or certificate, is fully as difficult, and conducted as fairly, as that for the Royal College of Veterinary Surgeons; and if the documents themselves be compared, the one is as good as the other, whether you compare the paper on which they are printed or the *tout ensemble* of both.

With these facts patent to all, am I to be told that I have no right to let the public know that I have passed both boards without being called in question as an aggressor on professional etiquette, and, in effect, saying that I have something that is spurious or of doubtful legality? Nay, sir! I cannot, I dare not, I will not stand by without raising my voice or wielding my pen against this continual croaking about Royalty, and these attempts at raising a prejudice against one document in favour of another, because, forsooth, one is not honoured by Royalty, and must, therefore, be elbowed into a corner as a mere mushroom affair that has sprung up in a night, and which they would wish to disappear in about the same time. What has Royalty ever done for the profession, or its *protégé* either, that it has to be hugged as a benefactor? There could not be a better proof "that the source of power is in the people" than that afforded by the inability of a Royal Charter to protect our rights granted, or apparently granted, by this right Royal Incorporation.

And what has the Royal College of Veterinary Surgeons ever done for the profession that it is entitled to our loyalty any more than the Highland Society? It has relieved us of our money, and given us a *sham* title instead, or a pretended right to a title that is common property, or, at least, that it is unable to protect.

The Highland Society does not pretend to give a title; but it examines us as to our knowledge, and testifies to our ability to practise the art. Its examinations are open to all; and it invites all who are interested to come and see and hear the proceedings; and in this respect it contrasts very strongly with the R.C.V.S., for most of its departments are presided over and certified by one man—no doubt the best in his way; but any one for such a position, however eminent he may be, would require to be possessed of the gift of infallibility.

I trust I have said enough to convince your correspondent "Rebus" that any licentiate of both boards has a right to use the letters "E" and "L." Even though there be no Royal College of Veterinary Surgeons for Scotland, there certainly is a Scottish Board which confers the title on students who have studied there; and there is still, it would seem, a Royal Veterinary College, with probably as good a right to the title of Royal as the one which now claims its exclusive use.

I must not, however, pursue this subject farther, but should just like to say a few words on Mr. Walker's paper on "Quackery in and out of the Profession," read at the Yorkshire meeting, as it is *apropos* to this subject.

First, then, I would say that is a manly, straightforward, and honest statement of the condition of the body corporate, and certainly does not reflect great credit on that body if the different phases of quackery he delineates in the profession be very extensively practised.

It would have been well that the opinions of some of those who took part in the "warm and animated discussion" which followed the reading

of the paper had been published, so that we could have ascertained whether his ideas were confirmed, or condemned, or extensively prevalent.

I am glad to find that the members were unanimous in their opinion as to the derogation suffered by the profession in consulting or being consulted by quacks; but I would take the liberty of saying that the method they have adopted to put them down—viz., "to advertise them in the local papers"—is worse than useless, and for the following reasons: Firstly, only one-half of the English people can read; secondly, those who can read do not, as a rule, read newspapers; and lastly, those who do read them will not be likely to be influenced by such an announcement. It is only by letting the public know, through the means of a prosecution in a county court, that we have an exclusive right to the title we adopt, that can ever have the slightest effect in impressing it on the public mind. The advertising in local journals will be a mere waste of money, for it will be as futile as it will require to be frequent if they set about it in earnest. So long as such opinions prevail in such high quarters we may despair of any relief being afforded by such means from such an intolerable grievance.

But who is equal to this undertaking? The Yorkshire Society, in *assuming* the *loco parentis* of the Royal College of Veterinary Surgeons, tends only to make matters worse, unless it should be followed by similar action on the part of other associations—by postponing the matter indefinitely, and giving the R.C.V.S. an excuse for its inaction. Surely, as Mr. Walker says, "when they get our money, and necessitate our spending a certain time at a recognised school before being eligible for examination even, it is not too much to expect that they should be able to give us a legal title to the name and status of veterinary surgeon."

But the transcendental ideas which obtain at the Council Board on the subject of education sink all others into insignificance, and warrant the inference that they care little for the profession if they can only assist the schools. Such, at least, has been the tendency of their policy for the three past years; and, judging from recently expressed opinions on the subject of protection, it will be some thirty years more before anything of this nature is attempted.

No less an authority than the *Lancet*, in treating on this subject, says: "Any corporation which contents itself with granting qualifications to practise under its authority, but declines or neglects to assert the value of its diploma—tacitly admitting that, so far as any protection is concerned, the license is not a necessity—plays not merely a careless but a short-sighted part. The licensing bodies have no moral right to leave their members and licentiates to take their chance with the public against unqualified practitioners."

But the Council generally seem to entertain the idea that their superior qualifications will overrule and extinguish all inferior and unlicensed practitioners, that we shall pale before the intellectual fires lit up by the future Fellows of this Royal Corporation, and disappear before their superior light like glowworms before the Orient sun.

It behoves those who preach these doctrines to prove them by their practice.

I am, dear sir, yours faithfully,

Market Deeping. JOHN GERRARD, M.R.C.V.S.

CURARE IN HYDROPHOBIA.

To the Editor of the VETERINARY JOURNAL.

HONOURED SIR,—In the *Times* of November 3rd, 1877, a letter from you to the editor is published on the subject of Hydrophobia, and in it occurs the

following: "In July, 1876, I published in the *Veterinary Journal*, of which I am editor, the account of Dr. Offenberg's successful case. Another instance in which the same potent drug appears to have also acted beneficially, is recorded in the *Veterinary Journal* for January of this year. Dr. Watson, surgeon to the Jersey City Charity, New York, successfully treated a case of Rabies in man, by the administration of woorara or curare and strychnine."

The information that a second case of Hydrophobia had been successfully treated with curare is of great interest, as it leads to the hope that other human lives—apparently lost—may be saved by that agent, and perhaps that curare may be the long-sought-for remedy for Hydrophobia. It appeared, however, very curious to me to read that in Dr. Watson's case strychnine was employed, besides curare. I am of opinion that the use of strychnine, especially in large doses, can only act injuriously during the convulsive spasms of Hydrophobia, as this poison produces spasms; and hence it seems probable that there exists an antagonism between the action of curare and that of strychnine. I intend publishing very shortly a memoir on the treatment of Hydrophobia, and it would therefore be of great importance to me to know something more about the Dr. Watson's case mentioned above, as it does not yet seem to be known in Germany.

I would therefore respectfully ask you to communicate more about the case. Especially would I be greatly obliged to you, if you would send me, if possible, the copy of the *Veterinary Journal* in which the case is recorded. I shall not forget to forward my memoir in return, when it is published,

Yours most obediently,

Dr. OFFENBERG.

Wickrath, Rhenish Prussia, *December 12th*, 1877.

[We gladly accede to Dr. Offenberg's request, and forward a copy of the *Veterinary Journal* of the date mentioned. A very detailed account of Dr. Watson's successful case was published in the *American Journal of Medical Sciences* for July, 1876 (p. 18), and from this our brief notice was taken. To this account Dr. Offenberg had better refer. We need only here state that both Dr. Watson and Professor Austin Flint regarded the case as one of true Hydrophobia. The curara and strychnine were not administered at the same time, the former being given until it produced ill effects, when the strychnine was given, as its use was then indicated. There was a gradual exacerbation in the severity of the symptoms until after the curara was administered subcutaneously in large and increasing doses—$\frac{1}{16}$th grain, $\frac{1}{8}$th grain, $\frac{1}{4}$th grain—every three hours; when they subsided after the third injection.

Another successful case which we have not recorded, and which does not appear to be known to Dr. Offenberg, is published by Dr. Polli, in *Le Paris Medicale* for May 17, 1877. A child, twelve years old, had been bitten by a rabid dog eighty days before the manifestations of the Hydrophobia symptoms. Subcutaneous injection of morphia and chloroform inhalation having been tried without success, curara was injected subcutaneously on seven different occasions, within the short space of five hours and a half. During this period twenty centigrammes (three grains) of curara were injected. The hydrophobic symptoms quickly subsided, being replaced by paralytic phenomena of a very pronounced character. Two days subsequently some renewed hydrophobic symptoms were completely dissipated by another injection of three centigrammes (nearly half a grain) of curara.

The child slowly recovered. We may remark that Sewell, of the Royal Veterinary College, a long time ago suggested the employment of curara in Hydrophobia; and Trousseau, ten years since, thought it might be useful in this malady if injected subcutaneously.]

CORRIGENDA.

MISS DICK desires to correct an error which appears in the opening address delivered by Dr. Aitken, at the Veterinary College, Edinburgh, and which was published in the last number of the *Journal*. The Doctor is reported to have stated that "it was now many years since Professor Dick came to Edinburgh;" but Miss Dick states that this is not correct, and we have her authority for saying that the greatly distinguished and talented teacher, whose memory is venerated by all who were taught by him, was born in Edinburgh, in the White Horse Close, Canongate.

PROFESOR WALLEY desires the following corrections to be made with reference to his remarks at the meeting of the Scottish Metropolitan Veterinary Medical Society (p. 452). Instead of saying that "Mr. Melvin had stated that Zymotic Pleuro-pneumonia was introduced by Dutch cattle," the remarks should read, "Mr. Melvin had stated that in those areas into which Dutch cattle were introduced, Pleuro-pneumonia existed to a greater extent than in any other part of Scotland—thereby leading to the inference that the Dutch cattle introduced the disease."

AT p. 450, line 18 from bottom, "weeks" should read "months"; and at p. 452, "Mr. Aitken, Leith," should be "Mr. Aitken, Dalkeith."

TO CORRESPONDENTS.

T. W. SIMCOCKS, DROGHEDA.—The best French work on "Veterinary Operative Surgery," is that just published in two volumes by Peuch and Toussaint, entitled "Précis de Chirurgie Vétérinaire, comprenant l'Anatomie Chirurgicale et la Médecine Opératoire." It has long been a cause for regret that there is no treatise on operative surgery in the English language, In German, there is Hering's excellent "Handbuch der Thierärztlichen Operationslehre," which is in some respects perhaps better than Peuch and Toussaint's. There is every need in this country for a well written and complete work of this kind.

Several communications and reviews of books, pressed out of this month's number of the *Journal*, will appear in our next.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from R. S. Reynolds, Liverpool; Graham Mitchell, Melbourne, Australia; E. Déle, Antwerp, Belgium; Hewlett & Co., London; T. D. Gregory, Bideford; Dr. Acland, University, Oxford; J. T. Duncan, Canada; A. E. Macgillivray, Banff; J. Rowe, London; Dr. Offenberg, Wickrath, Rhenish Prussia; Professor Walley, Edinburgh; Dr. Gowers, University College, London; W. Woods, Wigan; D. Menzies, St. Austell; J. Gerrard, Market Deeping; Miss Dick, Fife; Dr. Ewart, University College, London; J. W. Hill, Wolverhampton; T. W. Simcocks, Drogheda; A. Liautard, New York.

BOOKS: *E. Déle*, L'Emphysème Interlobulaire du Poumon et la Pleuropneumonie Contagieuse chez la Bête Bovine; *G. Armatage*, Every Man his own Horse Doctor; *J. G. Puts*, Zur Pathologischen Zootomie des Lungenrotzes der Pferd; *Dr. Gowers*, The Pathological Anatomy of Canine Chorea; The Pathological Anatomy of Hydrophobia; Transactions of the Pathological Society of London for 1877.

JOURNALS: *Nineteenth Century; Lancet; Edinburgh Medical Journal; Practitioner; Archives Vétérinaire; Annales de Médecine Vétérinaire; Recueil de Médecine Vétérinaire; British Medical Journal; Medical Times and Gazette; Medical Examiner; Journal of the Agricultural Society of Victoria; Deutsche Zeitschrift für Thiermedicin; Revue Vétérinaire; Journal de Médecine Vétérinaire; Le Journal d'Agriculture; Practitioner; Der Thierarzt; Oesterreichische Vierteljahresschrift für Wissenschaftliche Veterinärkunde.*

NEWSPAPERS: *Farmer; Mark Lane Express; Agricultural Gazette; Scotchman; Live Stock Journal; Australasian; Melbourne Argus; Melbourne Age; Melbourne Leader; Australasian Sketcher; Scotchman; Field; Montreal Herald; Magnet; Montreal Gazette; Jackson's Oxford Journal; Edinburgh Daily Review; Homeward Mail.*

All Communications, Books for Review, Advertisements, etc., must be addressed to the Publisher, 20, King William Street, Strand, W.C.

Morbid Specimens are to be forwarded addressed to the Editor, "Veterinary Journal," Brown Institution, Wandsworth Road, London.

Communications must be accompanied by the name of the writer, whether he may desire to have it published or not. Anonymous letters and articles cannot be inserted. The Editor does not hold himself identified with the views or opinions expressed by Contributors. Communications for insertion in the next number must arrive on or before the 15th of the present month.

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